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SOUTHERN MEDICAL ASSOCIATION, Twenty-Seventh Annual Meeting, RICHMOND, VIRGINIA, November 14-17, and a post-meeting day in Washington, November 18

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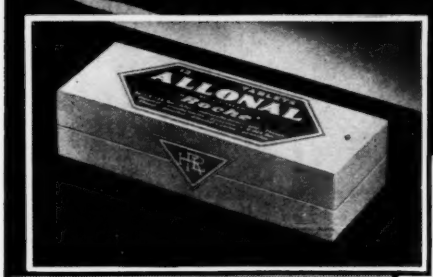

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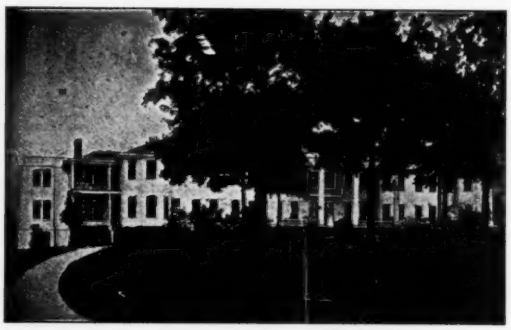

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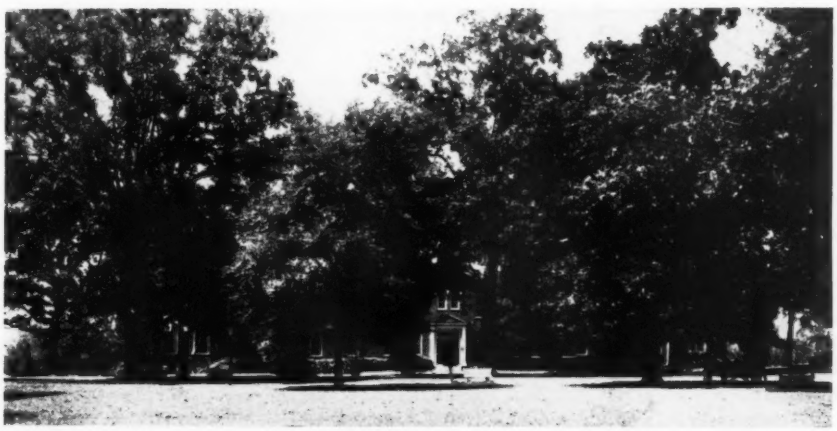

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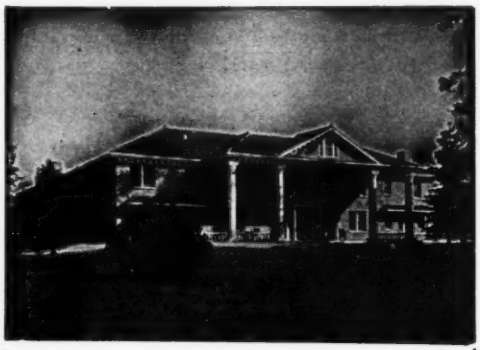

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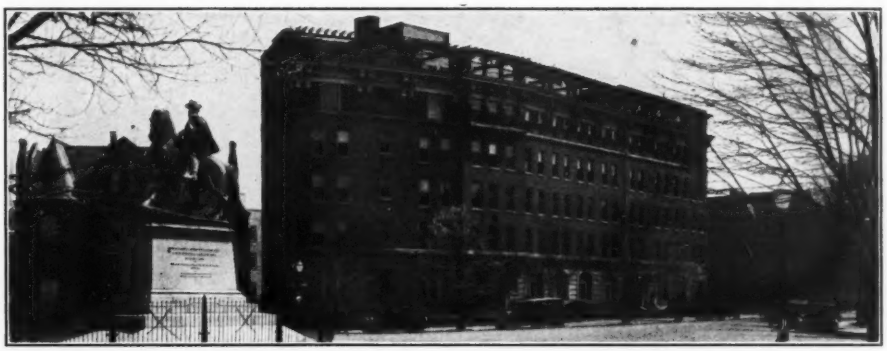

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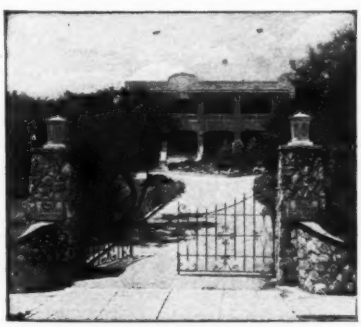

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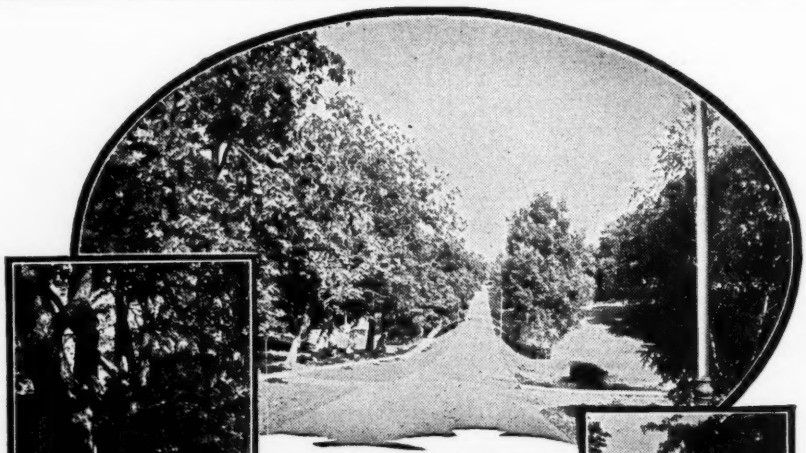

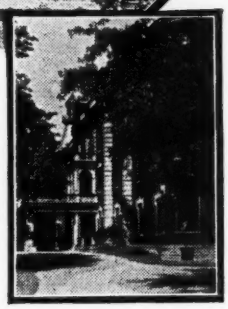

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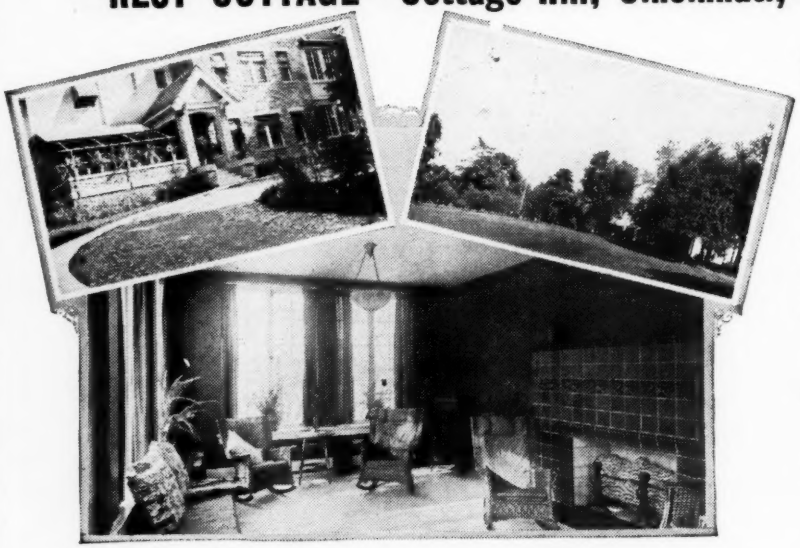

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MEDULLOBLASTOMA INVOLVING THE KIDNEY*

By EDWIN P. ALYEA, M.D.,
Durham, N. C.

There are many types of tumors, benign and malignant, of the suprarenal gland. Discussion will be limited here strictly to that peculiar tumor of neuro-ectodermal origin arising in the medulla of the gland. Before the suggestion of Virchow[47] in 1864 that these tumors might be of nerve tissue origin, that is gliomata, they had probably all been classified as sarcoma of various types. Even after this remarkable generalization, the diagnosis of sarcoma was most frequent.

In 1885 Dalton published the first case so completely described from the histological aspect as to enable us to be certain that the tumor was a neuroblastoma. He regarded it, however, as a lymphosarcoma. Six years later (1891) Marchand[32] reported a case of this disease, the first one to be recognized as a nerve tissue neoplasm, composed of undifferentiated nerve cells of the sympathetic system. In 1902, Kretz suggested that some of the tumors of the liver, classified as lymphosarcoma, might arise from cells originating in the sympathetic nervous system. Küster, in 1905, reverted to Virchow's suggestion, interpreting his tumors as malignant gliomata, and it was thought that the gliomatous character of the tumor was fairly well established. Furthermore, he was the first to use the term "rosette" to describe the pecu'iar grouping of the cells around the core of fibrils. This term has since been uniformly applied to this characteristic microscopic architecture. Wiesel, writing in the same year, called attention to the similarity of the tumor described by Küster with that of the primitive sympathetic structure of the medulla of the suprarenal gland. He concluded that the cells of the tumors under discussion had originated from the sympathagonia of the sympathetic nervous system. He showed, also, that the fibrils did not resemble neuroglia in staining characteristics, but appeared to be nerve fibers. In 1907, Alezais and Imbert added a new interest to the discussion by reporting a similar tumor occurring in the region of the coccygeal body. About this time Hutchison[17] published a report of 10 cases of so-called "sarcoma of the suprarenal" with metastasis to the bones of the skull. His clinical description was so convincing that that group now is known as the Hutchison type. Pepper described the other type about this same time. We have now, therefore, two main types distinguished as the "Hutchison" or that arising from the left suprarenal and the "Pepper" or that having its origin in the right suprarenal. The distinction between these types will be made later.

In 1910, J. E. Wright[54] reported 4 cases of this tumor and definitely described it as a neuroblastoma. He was the first to prove conclusively the neurogenic origin of the cells and demonstrated the very close similarity of their structure to the cells of the primitive sympathetic nervous system and the medulla of the suprarenal. He concluded that the suprarenal, hepatic, renal and many other round cell sarcomas of interest were probably of neurogenic origin. He proposed the term "neurocytoma." The grounds for assuming the existence of two different medulloblastic sarcomas of the suprarenal have never been adequately established. There is no evidence that the stroma or the blood vessels contributed to these nodes. The existence of lymph follicles in the normal suprarenal has not been proven, and the diagnosis of sarcoma has been based on the presence of indifferent round cells, the origin of which has not been considered. Yet in many cases the supposed sarcomas have presented typical "rosettes." The work of Wright was confirmed by Landau,[23] who stressed the fact that the fibrils need not necessarily take the stain in these tumors. In 1912, Pick[39] brought the number of cases in the literature to 19. Contributions by Wahl,[48] Harbitz,[11] Lehman,[27] Lambert, Wolback,[46] and Moore, Grundy, Shennan[2] and J. H. Berner had brought the cases by 1925 to about 35 or 38 in all. Ritter[40] in this year reported 2 cases in adults with their origins in the nerve cells of the intestinal sympathetic plexus of the jejunum. Landau[24] reports 2 cases originating in the abdominal sympathetic chain; Marcus describes one in a paravertebral ganglion; and Ewing a primary case originating in the femoral sympathetic plexus. Growths have been found in the intestines, uterus, nose, coccygeal gland, etc. Cases originating in other sites of the sympathetic nervous system are reported by Steward, Symmers,[45] Sussig[43] and Anderson and Shennan.[2] All these emphasized the possibility of having the primary growth anywhere that the cellular elements of the sympathetic nervous system are found.

Those primary tumors of the suprarenal medulla whose origin is ascribed to the nervous element of the sympathetic system form a group which, on account of both their rarity and the histogenic problems involved, have planted an

*Read in Section on Urology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

interesting chapter in pathological literature. According to the generally accepted opinions, these tumors arise from certain embryonic cells of the neuro-ectodermal system. These cells migrate in early fetal life from the anlage of the spinal cord to form the sympathetic chain and ganglia. The penetration of numbers of these cells into the already formed cortex of the suprarenal gland gives origin to the medulla of that organ. In this stage of development the cells are of an undifferentiated characteristic type, that is, the sympathetic neuroblast. Later, in the suprarenal and in the paraganglia, the differentiation into chromaffin cells and ganglion cells takes place.

The sympathetic nervous system contains two types of cells, the ganglion cell and the chromaffin cell. These chromaffin cells are identical with the chromaffin cells seen in the medulla of the suprarenal. Both the ganglion and the chromaffin cells arise from the same parent cell, the sympathagonia. We have, therefore, three types of tumors which may occur in the sympathetic nervous system or in the medulla of the suprarenal. In the first group we have the cells which are still undifferentiated or in the sympathagon stage, neuroblastoma or medulloblastoma. In the second group, we have tumors composed of cells of the higher stage of maturity which have assumed the characteristics of nerve elements and thereby justify the designation of ganglioneuroma. In the third group, we have cells which have reached the last stage of maturity, namely, the chromaffin cell, tumors of which are known as paraganglioma. Pure examples of each of these tumors are observed. There are, however, many transitions between them and, as in Wahl's[48] case, all three may be represented in portions of the same tumor.

(1) The ganglioneuroma is a red tumor and belongs in the group of tumors arising from the sympathetic system. It was first described by Weichselbaum in 1881. These tumors may reach considerable dimensions, but they are not locally aggressive and metastases are usually absent. They may arise from well differeniated sympathetic nerve tissue. The structures show a preponderance of medullated and nonmedullated nerve fiber, among which lie groups of more or less well-formed proliferating ganglion cells. The degree of malignancy in this type depends on the relative proportion of mature and immature cells; the more immature the cell the greater the malignancy.

(2) Neurocytoma or medulloblastoma, described by Marchand[33] in 1891, consists of a cellular tumor of the suprarenal medulla the structure of which reproduces the anlage of the sympathetic nerve tissue. As already stated, a full description of the structure and origin of these tumors was furnished by Küster in 1905. It is the tumor of the undifferentiated sympathetic formative cells.

(3) Paragangliomas are tumors of chromaffin cells in the last stage of maturity. They are very red tumors, usually small and symptomless, and as a result are found usually only at autopsy.

We will restrict ourselves now to the first tumor of the classification, namely, neurocytoma. Various names have been applied to this tumor: (1) neuroblastoma as described by Wright,[54] Wahl, Lehman,[27] Dunn, Weber, Fischer, Fleming, and Davidson;[9] (2) malignant neuroblastoma, by Lambert, Kwartin and Twiss; (3) neuroblastoma sympatheticum by Herxheimer, Wolback, Morse, Gunby, and Barnewitz; and (4) neurocytoma by Wright, Fleming, Davidson and others. Cushing,[4] in his book, "Tumors of the Glioma Group," differentiates between the medulloblastoma and the

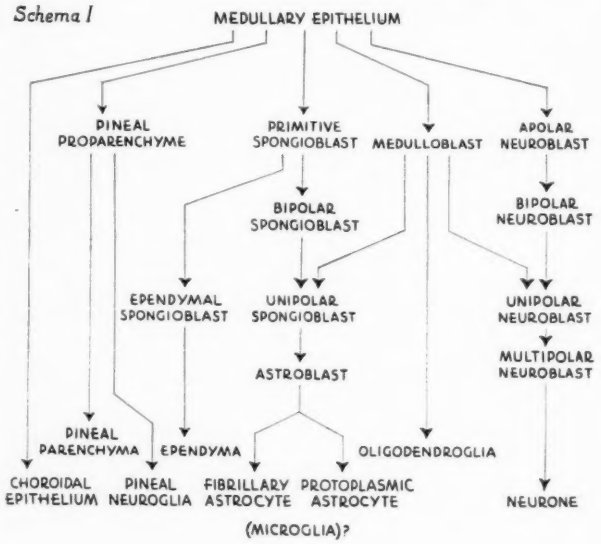

Fig. 1

neuroblastoma. He says that the neuroblastoma is one in which the cells are potentially divided toward the neuro rather than the glial elements of the brain, and as such are extremely rare tumors. Until a few years ago there was no distinction made between the neuroblastoma and the medulloblastoma, so that most of the cases reported in the literature as neuroblastomas are really what we now call medulloblastoma. Cushing states that in the brain this tumor originates in the medullary epithelium from the floor of the fourth ventricle. From here it proceeds to spread down the spinal cord and is known as a meningoblastoma. In the sympathetic system it is called a sympathicoblastoma; in the retina, a retinoblastoma. All these types really come from the medulloblastoma and are rapidly growing, soft, malignant tumors. It is an admitted fact that the primitive undifferentiated nerve cells are ectodermal in origin; these cells differentiate into spongioblasts and neuroblasts, the former develop into the supporting neuroglia, while the latter is the anlage of the sympathetic nervous system. Some of these neuroblasts migrate eventually toward the aorta to form the sympathetic chain with ganglionic structures, and others invade the mesodermal part of the suprarenal to form the medulla. It is believed by Kohn that these primitive nerve cells may come to rest anywhere in the body, remain in a latent state and at some later time proliferate and become neoplastic. In general, the cell maturity seems to be increased as the age of the patient increases and the malignancy seems to be in direct relation with the age of the cell and the age of the individual; that is, in children with undifferentiated medulloblastoma, metastasis is very rapid, while in older people the tumor is less malignant. While they are far more common in children, rarely they are found in adults, as reported by Symmers[45] and Barnewitz. Landau[23] pointed out in 1912 that these special tumors of the sympathetic nervous system are characterized by: (1) their congenital origin; (2) their arising in earliest life; (3) their metastasis showing a preference for certain tissues, namely, the liver and bony skeleton.

The primary growth is usually a dark brown or reddish, soft, fleshy mass, which is spongy and exudes a large amount of blood. When the tumor originates in the suprarenal it is almost always surrounded by the stretched suprarenal capsule. It usually depresses the kidney on that side, but does not invade it. This is a common and peculiar finding. There are only a few cases reported with invasion of the kidney, though it often causes great compression of that organ. The metastases show soft tumor masses similar to the primary growth. In the skeletal tissue the growths are easily penetrated by the finger. The skull shows depressions filled with this tissue. Metastasis takes place by way of the lymphatics and not by the blood stream; sometimes it spreads by direct extension to neighboring organs. The most common sites for metastasis are the liver, lungs, lymphatic tissue, cervical and retroperitoneal nodes, and osseous tissue, the ribs, sternum, cranial bones and orbits.

At present there is great doubt entertained regarding the justification of the two widely known types of medulloblastomas, namely, the "Hutchison" and the "Pepper" types. Clinically, they are certainly quite distinct. But pathologically they are the same. The separation into two distinct types was caused by the different clinical pictures and the location of the metastases. However, the latter is easily explained by the anatomical relationship of the two suprarenal glands. In 1907 it was reported by Hutchison[17] that a medulloblastoma originating in the left suprarenal metastasized readily to the cranial bones and, particularly, to the left orbit. Occasionally, it was seen also in the sternum, ribs and long bones. In this type the

Fig. 2
Kidney not involved but compressed (Lederer).

lymphatic nodes in the region of the gland were almost always involved. To the clinicians, the first observation may be an ecchymotic spot in one eye. It may suggest a chloroma or a scorbutus. A little later a proptosis is noted and soon a large orbital tumor develops. In 51 cases collected by Frew, 47 had cranial metastasis. It is of interest to note that in none of these was there any sign of premature sexual development, as one sees in tumors of the cortex of the suprarenal. The liver and lungs were not usually involved in the Hutchison type, although a few are reported. In contradistinction to this, Pepper reported a series of cases of this tumor which did not give the same clinical or pathological picture at all. His tumors originated in the right suprarenal and they metastasized rapidly to the liver. While the primary tumor in the suprarenal may be no larger than a walnut, the liver may become enormous and fill the whole abdomen. It is soft and hemorrhagic and, on section, its substance is entirely replaced by tumor tissue. Extension also to the lungs is frequent in the Pepper type. It is evident, therefore, that both pathologically and clinically there seems to be a real difference in these two types. Frew, however, explains the variation on the grounds that the lymphatic and venous circulation of the right and left suprarenals is different. The lymphatics of the left suprarenal pass out with the vein at the lower pole of the gland, draining with the renal vein and its lymphatics which have direct connections with the lumbar, aortic, intercostal and inguinal nodes. Others pass up the deep cervical chain to the base of the skull. Hence, tumors of the left suprarenal invade the regional nodes extensively, pass downward along the iliac to the pelvis and groin, through the posterior mediastinum, along the deep cervical chain to the skull and orbit or to the ribs and sternum. The lungs are never involved in tumors of the left suprarenal. On the other hand, the veins and lymphatics of the right suprarenal pass from the upper pole and join the vena cava and the main lymphatic trunk. This portion of the suprarenal is uncovered by the peritoneum and is in contact with a fair area of liver. Extension, therefore, to the liver, pleura and lungs is most common in this type described by Pepper. Sometimes it extends up the right cervical chain to the skull and gives a right exophthalmos. It is evident, therefore, that while these seem to be two distinct clinical types of the disease, pathologically they are the same and the apparent difference is only because of their anatomical relations.

The microscopic picture of this tumor presents a characteristic architecture, the best description of which I think is by Lehman.[28] The stroma of the tumor consists of fine, connective tissue vascular septa marking off alveoli which vary in shape, some being round, others irregular in outline. These alveoli contain the tumor proper. The connective tissue boundaries of these units merge into a few heavier septa that surround the lobules. The capsules of the latter fuse with the connective tissue of the general capsule. The tumor consists of two distinct varieties of tissue, transitional cell forms and an intercellular substance. The cell, a little larger than a lymphocyte with a minute amount of cytoplasm, is overwhelmingly the most frequent cell seen. It is a rapidly multiplying, highly embryonic undifferentiated round cell. The nucleus is round to pyriform and contains a large amount of dark staining chromatin. The size of this cell varies within small limits. Where the cytoplasm can be observed, it is slightly basophilic and finely granular. These cells associated with fibrils have the same morphology as the cells from which the sympathetic nervous system and the medulla of the suprarenal develop. They are considered as arising from migrated primitive nerve cells. There is present, also, a cell with a large pale nucleus and slightly acidophilic, pale, abundant cytoplasm that often takes a stellate or elongated form. It occurs in relatively small numbers and suggests the ganglion cell, but is not typical of the mature form. Transitional cells between these two distinct types are found in small numbers.

Among these cellular elements lies the characteristic intercellular substance, a very fine network of minute fibrils taking a pale, pink stain. Various methods are used to demonstrate the structure. The phosphotungstic stain of Mallory for neuroglia gives a blue color. Impregnation by Bielschowsky's[38] and Levaditi's methods for nerve fibers often shows that the fibrillar material is composed of naked axis cylinders as demonstrated by Dunn. Landau secured excellent results with van Giesen stain and showed that collagen is almost entirely limited to the stroma. Spielmeyer's and Cajal's methods for myelin sheaths and unmyelinated nerve fibers are also of assistance. These fibrils have the staining character of those occurring in the anlage of the sympathetic nervous system. While a demonstration of these fibrils together with the rest of the pathological picture is positive proof of the diagnosis of medulloblastoma, that fact that they cannot be demonstrated does

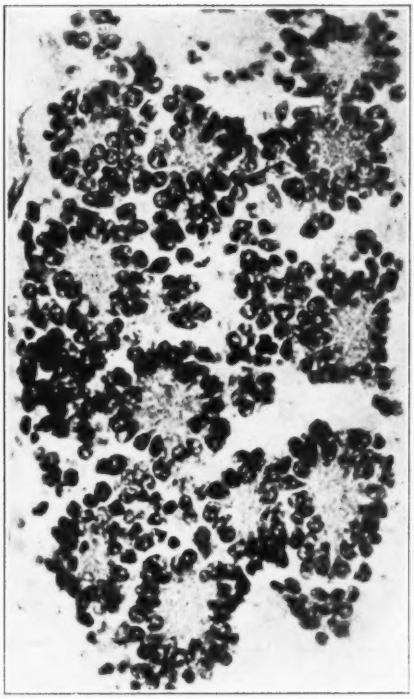

Fig. 3
Shows "rosettes." Denser fibril mass in center (Wright).

not spoil the picture or prevent such a diagnosis, for this is often the case. Wolback,[46] Moore, Dunn and Barnewitz and others have found great difficulty in staining the delicate fibers. They are much finer than connective tissue or neuroglia fibers. Inability to stain them may also be due to immaturity of the sympathetic nerve cells or to postmortem degeneration with transformation to hyaline or granular material.

Two main varieties of architecture are seen. The major part of the tumor is made up of dense masses of the small round cell filling the alveoli and producing a picture that resembles a sarcoma of the small round cell type. Standing out in contrast to this background are less cellular areas in which the characteristic structures of the neoplasm occur. These areas are scattered in the midst of the dense regions and they merge with no line of demarcation into the cellular structure. In these portions of the tumor, the intercellular substance is abundant and the large cell appears frequently. Here also quite characteristic arrangements of the small cells may appear, namely:

(1) The tumor cells are clumped together in spherical agglomerations.

(2) An oval ring of cells occurs about a central mass of fibrils. The cells are 2 or 3 rows deep. In these structures which are the typical "rosettes" of the literature, the nuclei tend to be pyriform with the long axes radially directed. The bundle of nerve fibers cut at right angles forms the center of the "rosette." These pseudo-rosettes, however, occur rather sparsely.

(3) In the third form the cells are grouped at one or both ends of a mass of intercellular substance, the fibrils of which tend to run parallel or to spread fan-wise toward the area of greatest cell concentration. This mass of fibrils may be practically cell free or dotted with nuclei in parallel chains.

(4) Forms intermediate may also be observed. It will bear repetition, that these arrangements are rare relative to the mass of uncharacteristic tissue. There is usually also extensive interstitial hemorrhage in both stroma and tumor tissue.

In the metastatic growth we see the round cell only; the fibrillar material never shows in the stains. The cells are usually in mass formation, but rarely they assume the rosette arrangement.

Fig. 4
Cells in parallel chains (Lehman).

Fig. 5
Note ecchymosis of eyelid. Exophthalmos and swelling of cranium, bilateral (Hutchison).

Where the metastasis involved bone, there were portions showing cartilage and embryonic bone formation. This new bone formation was probably due to the irritation of the periosteum by the foreign body of tumor cells and not, therefore, an integral part of the tumor itself.

Medulloblastoma is not an uncommon tumor in children, but very few cases have been reported in adults: Symmers and Barnewitz have reported two such. In children they usually fall in one of the two classes mentioned above, the Hutchison or Pepper type. A description of the course of a typical Hutchison type case will suffice for the clinical picture; as the general reaction is the same in both types. One reported by Sturtevant[42] is exemplary.

The child came into the hospital complaining of pain in the head, neck and right hip of four months' duration. She was markedly emaciated and there was pallor of the mucous membranes. When first seen, there was no palpable mass in the abdomen. The liver and the kidneys could not be felt. The urine was normal. Hemoglobin 75 per cent, white cells 6,000, polymorphonuclear cells 60 per cent, lymphocytes 20 per cent. During her stay in the hospital, she became progressively weaker with increasing pain in her hip, knees, back, and shoulders. The anemia also increased. Two months after admission she first showed some ecchymosis of the upper left eyelid. This was followed in a few days by an exophthalmos, which gradually increased, with hemorrhagic suffusion of the upper and lower lids. The hemorrhage was similar to that found in fractures of the base of the skull. There was limitation of motion of both eyes, but there was no lateral displacement of the eyeball, showing that the exophthalmos was caused by a growth involving the whole of the organ. Frequent recurrence of hemorrhages took place; the exophthalmos became so great that the eye closed and the eyeball was immovable. Very rapidly the swelling increased so that the eyeball was completely dislocated, and gradually the lower two-thirds of the cornea sloughed with perforations and prolapse of the eyelid. Finally an ophthalmitis resulted with complete infection of the eyeball.

In Hutchison's report two-thirds of the cases showed discoloration of one or both eyelids and this was frequently the first sign to attract attention. In many of the cases the first thing noticed was some swelling about the bones of the skull. In none of the cases reported is there any suggestion of premature sexual development such as is seen in malignant disease of the cortex of the suprarenal. The primary growth does not give any striking signs or symptoms, except general malaise and anemia; it is the effect of the metastases which attracts our attention. The dissemination of the tumor is rapid and there is marked progressive exhaustion and anemia, with indications of increased intracranial pressure. The growth in the skull often increases rapidly in

Fig. 6
Note enlarged abdomen. Tumor outlined. Exophthalmos, bilateral.

Fig. 7
Metastasis of medulloblastoma to the skin (not original).

size so that it fills the entire temporal fossa. The exophthalmos becomes so marked that the cornea often is ulcerated and entirely destroyed and the lens escapes from the globe.

The Pepper type, seen more often in children under three years of age, is characterized by rapid enlargement of the abdomen caused by the large liver. This is not usually accompanied by jaundice or elevation of temperature. Extreme anemia, secondary in type and other general signs, are exactly similar to those of the Hutchison type. The progress of the disease is very rapid and the younger the patient the more immature the cells and, therefore, the more malignant the tumor and, correspondingly, the more rapid the exodus. In Hutchison's cases the duration of life from the time of the earliest signs in the oldest child was six months and in the youngest, only one month. In 1927, Saphir reported a case in a child three weeks old; this is the youngest one I can find on record.

Diagnosis is usually quite evident from the physical findings. The two diseases which tend to simulate the appearance of these cases are infantile scurvy and chloroma, both of which may produce a similar ecchymosis of the eyelids. This may give identical proptosis and tumors about the skull. However, in chloroma the blood picture is entirely different; lymphocytosis is marked. Scurvy can be excluded by the absence of the other signs of the disease and the failure of antiscorbutic remedies.

The x-ray findings in medulloblastoma are characteristic and helpful in diagnosis. Glosnet says that 50 per cent of all the cases reported show bone involvement. The periosteum is usually infiltrated in neoplastic disease. In children periosteal elevation is often seen in syphilis, scurvy, leukemia and neoplasm. In medulloblastoma we have osteopericosteal changes with subperiosteal deposits and bone destruction; marked separation of the coronal sutures and orbital changes. The subperiosteal deposits are in the form of spicules at right angles to the shaft of the femur, or other long bones, with periosteal elevation. Destruction of bone usually occurs in the skull, in the orbital and the frontal regions. Then there is often a mottling of the parietal and occipital bones. This porous appearance is due to generalized pin point areas of rarefaction; seen sagitally, these rarefactions often assume a radial arrangement.

The ultimate prognosis in this disease, of course, is hopeless. There is only one case of reported recovery following operation. Dr. Bartlett, of St. Louis, removed a small neurocytoma of the suprarenal 15 years ago and Dr. Lehman[28] in the *Annals of Surgery* of this year reports

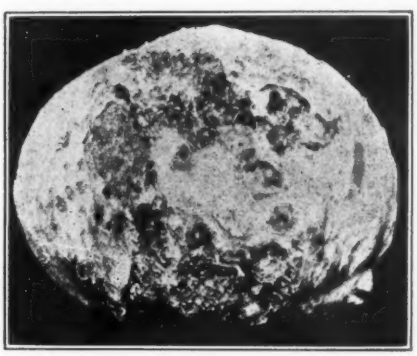

Fig. 8
Metastasis to the calvarium (Karelitz).

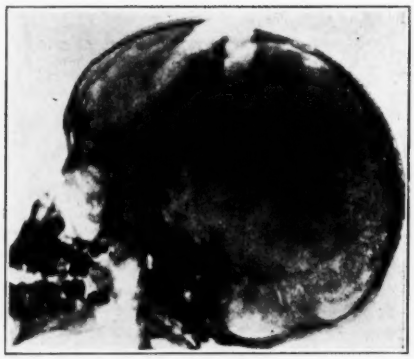

Fig. 9
Diastasis of frontal suture. Mottling of cranial bones (Heule).

that this child is still alive. The only other method of treatment that might be of some aid is the deep x-ray. Nothing has been found on this subject in the literature, but I feel confident that if it has any beneficial effect at all, it would be only temporary and offer symptomatic relief by reducing the size of the primary tumor or metastatic nodules. As stated elsewhere, all cases have died from one month to six months after the first signs of the disease; and the younger the child, the more rapidly fatal is the tumor.

We are presenting 11 new cases of medulloblastoma, nine arising from the medulla of the suprarenal and 2 from the retina of the eye. Seven of these 11 cases had involvement of one or both kidneys. Ten of these are from the records of the Johns Hopkins Hospital and one from the Duke Hospital. Those from Johns Hopkins Hospital were very kindly collected for me by Dr. W. W. Baker, of the Brady Clinic, to whom I am gratefully indebted. As far as I have been able to ascertain, none of these 11 cases has been previously reported. A separate description of each case is unnecessary and they are shown only in brief outline, the physical findings, gross autopsy description and the microscopic report. Eight cases were under four years of age and correspond very well to one of the accepted types of medulloblastoma. There was one case found in each of the fourth, sixth and seventh decades of life; this agrees with the opinion of other authors that the tumor is most often seen under four years of age and is rare after the first decade. Almost all of these cases had the typical picture of enlarged abdomen with evidences of metastases to the skull or orbits. Autopsies showed that there was a tumor in one of the suprarenals with metastases to the retroperitoneal lymph nodes, liver, lungs, bones of the skull, ribs, vertebrae, kidneys, and elsewhere. There were several reasons for reporting these cases: first, to add these 11 cases of medulloblastoma of the suprarenal to the literature; second, to emphasize the fact that this tumor can occur in adults as well as in children; third, to show that the tumor is not so malignant in adults as in children; fourth, to show that metastasis or extension to the kidneys may be more common than one would expect after noting the few reported in the literature. In our series 6 out of 11 had renal involvement and we must, therefore, always bear this in mind when dealing with a kidney tumor. Fifth, neuroblastoma of the retina or better called retinoblastoma is an exactly similar tumor arising from the undifferentiated nerve cell in the retina of the eye.

The only case that we wish to report in some detail is that of the adult in the sixth decade of life, since the clinical course of this case is different from that in the infants.

CASE REPORT

Patient B. W., No. 1928.—The patient was a married woman 55 years of age who had had pain in the side, back, and abdomen for eight months. The patient's health had been exceptionally good until the beginning of the present illness, about 10 months before admission. At that time she began to lose her appetite and weight and a month later began to have pain under the right costal margin. Later she could not sleep because of pain and she grew generally weaker. For the previous 5 months she had been having considerable pain across her back and in the lower abdomen. Her appetite became very poor. She was markedly constipated and she lost weight, dropping from 165 to 100 pounds. Examination showed a very thin, emaciated, pale and jaundiced woman of middle age who had evidently been ill for a long time. There were no abnormal findings in the head or chest. Her abdomen was soft, and no muscle spasm was present. There was a definite large mass coming down from under the right costal margin and filling the right upper quadrant. It could be traced across the midline and was lost under the left costal margin. It was thought that this was an enlarged liver or, more likely, a tumor of the retroperitoneal glands. On the left side, the lower pole of the kidney could be felt very distinctly. Plain x-ray showed a large mass in the upper abdomen and the left kidney shadow was considerably larger than normal. Upon cystoscopic examination, the right kidney proved to be normal, but from the left kidney there appeared no urine; only bloody washings were obtained. A left pyelo-ureterogram showed a marked narrowing and angulation of the upper third of the ureter and the pelvis showed complete obliteration of the middle and upper calyces. There was some dilatation of the lower calyx. Impression was that there was a large tumor of the left kidney with apparently metastasis to the retroperitoneal or peripancreatic lymph nodes and liver.

	Physical Findings	Autopsy	Metastases to			Microscopic
From Johns	Hopkins Hospital		Liver	Lungs	Kidney	
R.D., age 23 mos. Died 6/6/22 No. 7028	Fever, mass in rt. flank. Mass in rt. abdomen extending from ribs to pelvis	Emaciated. Yellowish white nodules on enlarged liver. Lt. kidney and suprarenal normal. Rt. suprarenal not found. Tumor. Rt. kidney not invaded	Yes	Yes	0	Suprarenal tissue shows small cells arranged in rosettes as in medulloblastoma
R.G.C., age 4½ years. Died 1/2/25 No. 4076	Small nodule over eye. Progressed, involving whole eye. Liver and spleen enlarged. Fever. Rapid downhill course. Death	Emaciation. Liver at level of umbilicus. 200 c. c. free fluid. Gray nodules in lungs. Lt. kidney normal. Rt. kidney normal. Rt. suprarenal and tumor separated from kidney by capsule. Metastases to orbit	Yes	Yes	Yes	Medulloblastoma of rt. suprarenal. Metastases to liver, kidneys, lungs, lymph glands and right orbit
K.L., age 1 yr. Died 5/1/14 No. 4118	Mass in rt. kidney region. Enlarged liver. Fever. Death following exploratory operation	Mass in rt. side pushing kidney into pelvis. Pneumonia	0	0	0	Small round cells arranged in rosettes. Diag. neuroblastoma of suprarenal, rt., with invasion of regional lymph nodes; metastasis to tissues around vena cava and surgical incision
S.M., age 64 Died 7/15/28 No. 10476	Dyspnea. Pain in chest. Abdominal tumor. Laparotomy. Rapid downhill course. Death. Pigmentation about eyes and abdomen. Mass in rt. upper quadrant, extending into retroperitoneal lymph nodes and vertebrae.	Tumor of rt. suprarenal extending into rt. kidney, liver and retroperitoneal tissue; metastases to retroperitoneal, pancreatic, mediastinal and axillary nodes. Ribs, vertebrae, skull and diaphragmatic pleura. Invasion of vena cava	Yes	Yes	Yes	Neuroblastoma
W.R., age 38 Died 10/29/28 No. 10594	Pain in R.U.Q. Enlarged liver. Fever. Jaundice. Rapid downhill course. Death	Mass in lt. kidney region. Suprarenal replaced by tumor. Liver filled with metastases	Yes	Yes	0	Tumor of left suprarenal (neuroblastoma with metastases to liver, lung and retroperitoneal lymph nodes)
M.H., age 3½ mos. Died 1/13/25 No. 8444	Large abdomen since birth. Received radium treatment. Rapid enlargement of abdomen. Downhill course and death	Liver practically fills abdomen. Tumor in left suprarenal. Rt. suprarenal shows area of involvement also	Yes	0	0	Neuroblastoma of left suprarenal with extensive metastases to liver and right suprarenal
L. B., age 16 mos. No. 8450	Loss of weight. Abdominal mass. Cervical abscess. Rapid downhill course. Death	Large mass, purplish in color, arising in retroperitoneal region. Rt. kidney normal. Lt. kidney invaded by tumor. Liver slightly enlarged	Yes	0	Yes	Neuroblastoma arising in left suprarenal with metastases to rt. suprarenal, intestines, liver, lymph nodes, femur marrow and left kidney. Invasion of pelvis and left kidney and vena cava
B. G., age 26 mos. Died 1/15/26 No. 9029	Loss of weight. Abdominal mass. Radium. Death. Mass noticed for 4 months before death	Tumor occupying lt. retroperitoneal space. Tumor is red and yellow. Tumor extends to and invades suprarenal, rt. Obstruction of vena cava. Extension through diaphragm and along esophagus and aorta	Yes	Yes	Yes	Neuroblastoma of lt. suprarenal involving lt. kidney. Metastases to liver, lungs, and left supraclavicular nodes
N.D., age 3 yrs. No. 9272	History of enucleation of both eyes. Gradual extension of tumor in skull	Tumor of retina. Extension to meninges. Involvement of cranial bones and soft tissue of face and neck.	Yes	Yes	0	Neuroblastoma of retina. Metastasis in liver, bones, axillary, retroperitoneal, inguinal and popliteal lymph nodes
C.S., age 2½ years. Died 9/18/26 No. 9462	History of drowsiness, irritability, loss of weight—2 mos. Exophthalmos, rt., 7 days prior to admission. Nodules on the head. Rapid downhill course with necrosis of rt. eye. Masses on skull, increasing in size	Neuroblastoma of retina with extension to bones of skull, subdural space and galea; widespread extension in continuity involving cervical, supraclavicular, axillary, mediastinal, peritracheal, aortic, retroperitoneal, peripancreatic, periportal and inguinal lymph nodes. Metastasis to liver, vertebrae, ribs and kidneys. Emboli of tumor cells in lung capillaries	Yes	Yes	Yes	Neuroblastoma of retina
From Duke	Hospital					
B. W., age 55 years. Died 12/11/30 No. 1928	Increasing general malaise and loss of weight. Jaundice. Mass in abdomen. Enlarged left kidney	Tumor of lt. suprarenal and lt. kidney. Medulloblastoma. Metastases to rt. suprarenal, peripancreatic and retroperitoneal lymph nodes. Compression of common bile duct by tumor nodules. Jaundice; thrombosis splenic and portal veins	No	No	Yes	Medulloblastoma

For this reason, it was thought advisable not to explore the left kidney, but to make a midline incision and explore the mass in the right upper quadrant to see whether or not this was a large metastatic mass; because if this were so, it would be useless to operate upon the left kidney. Under spinal anesthesia this was done and there was found a large tumor mass filling the upper abdominal and retroperitoneal regions, involving the pancreas and gall ducts and reaching over to fix itself to the left kidney. Obstruction had occurred to the common bile duct which accounted for the jaundice. A cholecyst-gastrostomy was, therefore, done and nothing else. The patient lived only a week after the operation.

Pathological Diagnosis.—Medulloblastoma of the left suprarenal and kidney with metastases to the right suprarenal, retroperitoneal, and peripancreatic lymph nodes. Compression of the common bile duct by tumor nodules; jaundice; thrombosis of splenic and portal veins. Splenomegaly. Recent cholecyst-gastrostomy.

"Examination of the abdomen (Dr. Forbus) shows that there is a large tumor diffusely infiltrating practically the whole of the left kidney, leaving only a small inferior portion of the lower pole uninvolved. The tumor has a peculiar gray translucent appearance with yellow areas of necrosis scattered through it. The ureter from this kidney as well as the vessels that come into and leave the hilum are surrounded by tumor which has extended from the kidney. One gets the impression of the tumor from the gross appearance that it is unlike the ordinary type of hypernephroma. There is a large quantity of tumor in and about the head of the pancreas and it has produced such an enlargement of the periductal lymphoid tissue that an obstruction has occurred in the common duct. Transection shows an extreme jaundice of the liver. The portal veins are completely occluded by an old thrombus. Numerous branches of the portal vein, especially the splenic vein, are, also, completely closed by the thrombus. The renal vein is not filled with tumor, but the lumen is partially closed by pressure from the surrounding tumor. There are metastases in the opposite suprarenal, retroperitoneal, and peripancreatic lymph nodes. The spleen has the characteristics of chronic passive congestion which is doubtless due to obstruction of the splenic vein."

Adrenal

Fig. 10
Suprarenal medulloblastoma invading the kidney (author).

The tumor as it appears, grossly, both in the kidney and in its various metastases in the lymph nodes, is one which cannot be definitely identified. It is safe to say it is not the ordinary hypernephroma in view of our inability to distinguish the suprarenal and also in view of the rather heterogeneous character of the cells forming the tumor. It is suggested that its origin in reality is in the suprarenal and that the kidney became secondarily involved.

Microscopic Description.—The left kidney is almost completely occluded by tumor tissue. This tissue is composed of round cells with very dark staining neuclei and only a little cytoplasm. The cells are only a little larger than lymphocytes with scant cytoplasm present. Mitotic figures are very numerous. Some portions of the tumor are extremely cellular, there being no demonstrable stroma. Here and there were masses of cells arranged in "rosettes" or "pseudorosettes." The cells in these were 3 to 4 in depth with pink staining material in the center. Scattered at intervals through the tissue one sees an occasional large cell. These may be spongioblasts which do not stain with Hortegia's fourth varient nor the gold sublimate of Cajal.

It was thought at first that we had here a medulloblastoma originating in the kidney. On looking up the literature, however, we found that there was no similar case reported. This made us skeptical of the provisional diagnosis, and further careful search showed us the real condition. The suprarenal was entirely replaced by tumor tissue and had become so closely adherent to the kidney that it was removed in one piece with the kidney and indeed fitted in very nicely as the upper pole. But as is shown in the picture, there is a distinct line of demarcation between the two—a dense fibrous capsule. Microscopic sections taken through this region showed clearly that this was suprarenal, almost entirely replaced by tumor tissue which invaded the kidney.

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DISCUSSION (*Abstract*)

Dr. Raymond Thompson, Charlotte, N. C.—The rare case presented by Dr. Alyea is one that occasionally enters the field of differential diagnosis of kidney tumors. Quite recently we saw a similar case which, like his, was primary in the suprarenal with secondary effects upon the kidney. There was no direct extension to the kidney, although there was displacement of the kidney by the increasing size of the primary growth.

I have also photomicrographs of a case that falls into the classification of a primary epidermoid carcinoma of the ureter. This patient, age 33, was the wife of a physician. Six months previous to our first examination she had had a right nephrectomy. At this time, the surgeon reported finding a Y-ureter with a double pelvis and a hydro-pyonephrosis. Upon exploratory operation for a tumor mass in the right inguinal region (associated with a septic temperature and leucocytosis) a small sausage-shaped tumor was found occupying the upper part of the ureteral stump. There was no neoplastic growth in the lower ureter or in the bladder and there was no sign of neoplasm in the right kidney which was forwarded to us for examination by her former surgeon. The epithelial neoplasm was situated just below the Y. It is not infrequently the case that these growths occur associated with anomalies of the ureter.

This patient died 5 months after the last operation with abundant clinical evidence of widespread metastases.

LEPROSY IN THE SOUTHERN UNITED STATES*

FROM THE HISTORIES OF 637 CASES HOSPITALIZED IN THE NATIONAL LEPROSARIUM

By O. E. Denney, M.D., D.T.M., F.A.C.P.,† Carville, La.

In 1928, Hopkins and the writer[1] presented a statistical study of the records of 700 cases of indigenous and exogenous leprosy hospitalized in the National Leprosarium. It seems desirable to amplify the observations concerning indigenous leprosy, particularly with regard to its origin and geographic progression in the South.

That leprosy did not exist in the Western Hemisphere before the arrival of Columbus has

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†Surgeon, U.S.P.H.S., Medical Officer in Charge U. S. Marine Hospital, Carville, Louisiana.

Fig. 1

Distribution of cities and towns in the Southern states from which cases of leprosy have been referred to the National Leprosarium. The radial progressive spread of the disease is suggested from the concentration of affected towns in the lower Mississippi Valley.

been assumed from the absence of even presumptive evidence to the contrary. That leprosy appeared in tropical and sub-tropical America in the wake of the earlier explorers and settlers seems to be well established. History does not clearly indicate from which older foci the newly established cases arose, but it seems not unlikely that the disease was introduced from the known infected centers of Europe and was augmented by traffic in leprous slaves, the greater part of whom came from highly infected regions of Africa. The early presence of sporadic cases of leprosy in the New World seems to have attracted little governmental or medical attention until whites as well as blacks developed the disease.

The center of the slave markets for the Spanish Main was Cartagena in Colombia and here, in 1573, the first white man of prominence was declared a leper. That leprosy early assumed considerable proportions is manifest from the establishing of a leprosy hospital at Cartagena early in the Sixteenth Century.

It was evident to various writers that leprosy was introduced into the West Indies at an early date; Hans Sloane,[2] whose observations began in 1687 on the Island of Jamaica, recorded a case which he regarded as lepra Grecorum; a century later leprosy was considered a scourge among the negroes, and the whites were not exempt.

Leprosy, 150 years ago, was not an uncommon disease in the delta of the Mississippi, for during the administration of Ulloa (1766 to 1768) he attempted to prevent its spread by isolating the lepers at the mouth of the river at Balize. Later (1785) Miro established a hospital for the lepers of New Orleans, selecting a ridge of land at the rear of the City between the Mississippi and Bayou St. John. *La Terre des Lepreux*, or Lepers' Land, appears to have had a brief existence; in the course of a few years the number of these patients gradually diminished, either by death or transportation, and the disease disappeared almost entirely; the hospital went into decay, and Lepers' Land remained for many years a wild looking spot, covered with brambles and palmettoes, until by the growth of New Orleans under the flag of the United States, it formed part of the suburb Treme.[3]

Subsequent sporadic cases attracted little public health interest and it was not until 90 years later that Joseph Jones, in 1872, noted the increasing importance of leprosy in certain parts of Louisiana. The cases which he personally observed or contacted through his confreres were principally of French descent, many being offsprings of the Acadians who had been deported from the neighborhood of New Brunswick, Canada, in 1755. In 1888, Blanc[4] reported 42 cases of leprosy seen by him in New Orleans within a period of five years. The histories which he obtained indicated that these lepers were, for the most part, epidemiologically related to the stray cases which came with the Acadians from Nova Scotia, to immigrants from the West Indies

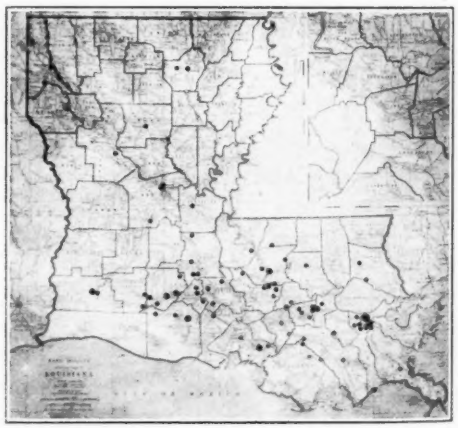

Fig. 2

Indicating cities and towns in Louisiana from which cases of leprosy have been hospitalized.

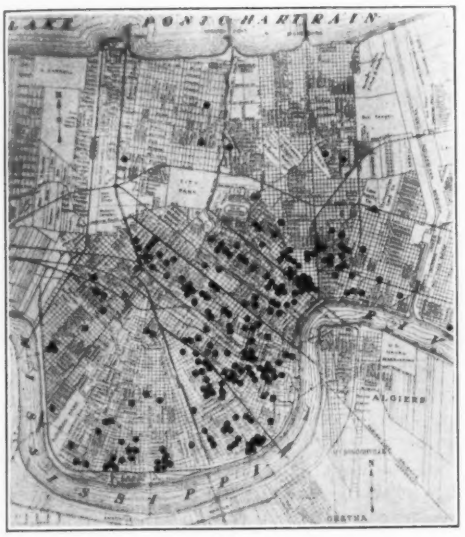

Fig. 3

Locations in New Orleans from which cases have been hospitalized in Carville, demonstrating the rather widespread distribution throughout the older and more congested part of the city. Miro's hospital (1785) and the Hagen Avenue Pest House indicated by cross.

and to more recent immigrants from Western Europe. A few of the more repulsive cases were hospitalized in the second New Orleans leprosy hospital known as the "Hagan Avenue Pest House." In 1894, Louisiana discontinued the segregation of its lepers in the "Hagan Avenue Pest House" in New Orleans and removed the few remaining cases to the new location at Carville. The case records from which the following remarks were made cover the 34-year period since the institution was begun as the Louisiana Leper Home and subsequently (in 1921) became a Federal hospital.

A total of 307 patients from New Orleans and 164 from the rest of the State have been hospitalized. A location map of the cases hospitalized from New Orleans (*Fig. 3*), while of little practical value, is interesting in that it demonstrates the concentration of cases in the older, more densely populated portion of the City and the subsequent more gradual spread into the newer portions. A perhaps coincidental concentration of cases is noted around the site of the old "Hagan Avenue Pest House" as well as an even more marked concentration of cases around the long since forgotten site of Miro's Eighteenth Century hospital.

Of the 565 lepers born in, and who are presumed from their records to have developed leprosy in, the southern United States, 434 were at one time or another Louisianians. *Fig. 1* indicates that the gradual spread of leprosy up the Mississippi Valley has naturally and inexorably followed the trail of the settlers; single cases and later foci of infection of greater or lesser importance have developed; the distribution of both cases and foci leads radially from New Orleans.

It is interesting that of the 471 cases of leprosy which have developed in Louisiana, 391 were born in Louisiana, 43 were born elsewhere in the United States and developed the disease in Louisiana, while only 37 foreign born developed leprosy in that State. The conclusion seems unavoidable, therefore, that the State of Louisiana has some inherent, although undetermined, factor which renders its populace more liable to develop the disease. Considerable speculation has been undertaken in explanation, but the most logical seems to be dependent upon the early implantation of the disease in one cen-

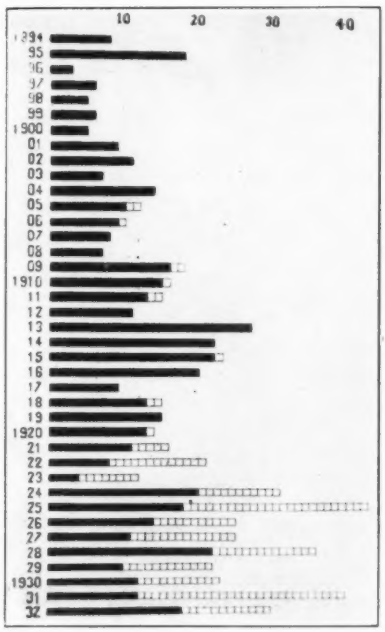

Fig. 4

Annual admission of new patients from the Southern United States, solid black representing cases from Louisiana and, cross-hatching, cases from other Southern states.

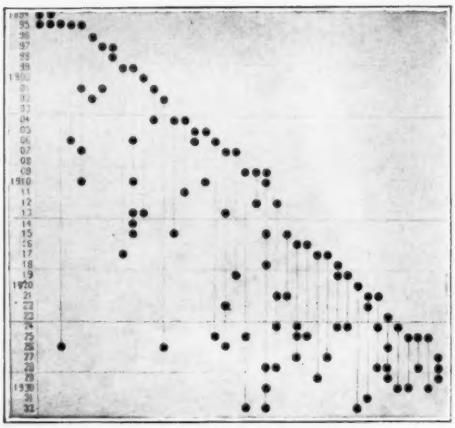

Fig. 5

Demonstrating the familial tendency of leprosy, the upper circles showing the year of admission of the first case of leprosy in a family, the dependent circles representing cases subsequently admitted from the same family.

ter, New Orleans, from which the rest of the State was colonized.

Other Gulf ports, notably Key West and Galveston, likewise seem to have had endemic leprosy established at fairly early dates. Succeeding cases have developed through the years with some regularity.

The Key West focus is thought to have originated from its commercial contact with the West Indies. The first Key West leper admitted to Carville (in 1905) was born of Bahaman parentage in Key West. Twenty-seven additional lepers have been received from this focus. Of the 48 admitted to Carville from Florida, 40 claimed that State as their birthplace.

The Galveston focus, while not as old as the Louisiana ones, was considered by Isadore Dyer[5] as directly traceable to New Orleans. Boyd and Fox,[6] in 1920, presented an epidemiologic study of the Texas focus, reporting 45 cases developed within 30 years and referred to 25 others existing previous to their survey. The first case of which they found record was recognized in 1886, fifty years after the settling of the City. The Galveston focus has contributed 15 cases to Carville. The first was admitted in 1909.

In Louisiana and Florida, the extension of case development may, for the most part, be traced to the older foci or to the sources responsible for them, but the continued and recent development of new cases in Texas seems not entirely so dependent and it is significant that of the 51 American-born Texas lepers, 45 were born and developed leprosy in that State; whereas, of 15 foreign-born Texas lepers admitted to Carville in very recent times, 13 were born in Mexico. (A total of 72 lepers of Mexican origin have been received in Carville from the entire United States.)

In *Fig. 4* there may be seen a gradual increase, in five-year periods, of cases of leprosy admitted to the leprosarium from the Southern states. It should be noted that prior to 1921 the Louisiana Leper Home but rarely accepted patients from other states. Subsequent to that time the facilities of the Home became available for use by the entire United States. The apparent increase in the hospitalization of patients from other parts of the South is not necessarily indicative of an increase in leprosy. It is mainly due, it is thought, to the utilization of centralized facilities.

Table 1 and *Fig. 1* indicate a fairly wide spread of this comparatively rare disease in the Southern states. Should not the source of infection have been quenched by segregation, one hesitates to estimate to what extent the disease might have spread in susceptible communities. It cannot be assumed that all cases of leprosy in the South have been segregated. Personal information is to the contrary. Furthermore, the diagnosis of leprosy is frequently made comparatively late in the existence of the individual case in the United States. Consequently, it would not be unfair, epidemiologically, to consider that each of these cases already isolated may have been responsible for an average of at least one additional case. The writer bespeaks

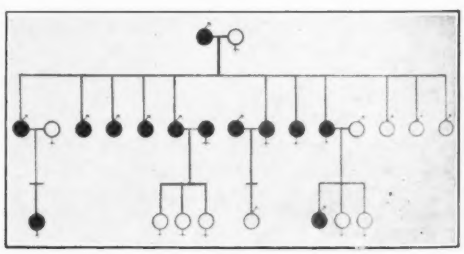

Fig. 6

An unusual demonstration of the familial tendency of leprosy in a Texas family.

Table 1

SOURCES OF LEPERS IN THE SOUTHERN STATES

Born in—	Developed Leprosy in— Alabama	Arkansas	Florida	Georgia	Kentucky	Louisiana	Maryland	Mississippi	Missouri	N. Carolina	S. Carolina	Oklahoma	Texas	Virginia	Elsewhere	Totals
Alabama	2	1	1	1		3							2			10
Arkansas						1									1	2
Florida			34			1		1								36
Georgia				4		1									1	6
Kentucky				1	1				1						1	4
Louisiana						391		3					5	1	1	401
Maryland						1	2									3
Mississippi		1				18		3								22
Missouri		1				4			2							7
N. Carolina						2										2
S. Carolina			1								2					3
Tennessee						1										1
Texas		1				1			1				45		3	51
Virginia						1										1
Pennsylvania			2			3							1			6
New York			1			4										5
Massachusetts						1										1
Iowa						1										1
Rhode Island									1							1
Ohio			1										1			2
Sub-total	2	4	40	6	1	434	2	7	5	0	2	0	54	1	7	565
Argentine									1							1
Bahamas			3													3
Bohemia														1		1
Cuba			3													3
China						1			1							2
Denmark						1										1
France						7										7
Greece									1							1
Germany						10										10
Hungary													1			1
Italy						8										8
Ireland						4						1	1			6
Jamaica						1										1
Mexico						3							13			16
Philippines							1									1
Norway						1										1
Russia					1	1										2
Spain								1								1
Tahiti									1							1
Virgin Islands														1		1
West Indies			2					1						1		4
Sub-total			8		1	37	1	2	4			1	15	3		72
	2	4	48	6	2	471	3	9	9	0	2	1	69	4	7	637

earlier diagnosis in order that sources of infection may be quenched.

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DISCUSSION (*Abstract*)

Dr. P. M. Payne, Napoleonville, La.—We of South Louisiana who have visited the Leprosarium at Carville and have seen the wonderful work that Dr. Denney and his associates are doing, are deeply impressed with the curative measures being carried out there as well as the educational work being done by Dr. Denney before various medical societies.

Quite distinctly do I remember the first case of leprosy that I ever saw. It was shown me by the late Isadore Dyer in 1897 while he was Professor of Dermatology at Tulane. Dr. Dyer had been consulted relative to a skin disease of one of our out-patients and when he had examined the woman (colored) he turned to me and said: "This woman has leprosy," and so saying, he thrust a pin into one of the "anesthetic spots" without any apparent discomfort to the patient, remarking, "Still they say there is no leprosy in Louisiana." The incident made an indelible impression on my mind. In a residence of several years following that occasion in the tropics, it was my privilege to see a considerable number of cases of leprosy.

In August of this year (1932), while holding a typhoid clinic on one of the large sugar plantations in Assumption Parish, Louisiana, I was consulted by a white woman, mother of several small children, concerning a skin condition which she said that she had had for two or three years.

Not wishing to be precipitate, I told her that I could not make the diagnosis myself, but that I would find some one who could tell her what the trouble was and what to do for it. I then reported my findings to the parish health administration. By this office it was in turn reported to the Louisiana State Board of Health, thence to the Surgeon General in Washington. In much less time than one might think, Dr. Denney was advised of the matter from Washington. He immediately sent Dr. Johansen, of the U.S.P.H.S., to investigate the case. Dr. Johansen reported positive findings and the patient very readily consented to go to Carville. There is much hope of her recovery.

The various members of the family were examined without discovering any apparent symptoms of the disease.

The profession greatly appreciates Dr. Denney and the splendid work being done at the Carville Leprosarium.

MEDICOLEGAL INVESTIGATION*

A PROBLEM FOR COORDINATED MEDICAL AND LEGAL TALENT

By WILEY D. FORBUS, M.D.,
and
JOHN S. BRADWAY, LL.B.,
Durham, N. C.

Doubtless every institution which has undergone a reorganization of its faculties and has established new schools of medicine and law has been presented the problem of what should be done about the medicolegal education of its students and indeed its staff. Our University at any rate has had this experience.

The staff of the medical school of Duke University had not progressed in its development beyond the age of swaddling clothes before it became imperative that we do something about medicolegal matters, because we were at this early age confronted by problems which were indeed not of our making. The establishment of a new medical school in a community that had not, at least for years, known anything of the working of a university clinic, and furthermore, the setting up of this new undertaking in a virtually newly created university whose new buildings and other outward appearances were unfortunately such as to suggest wealth and power, aroused, as such developments always do, a feeling on the part of a few that here at last was provided an opportunity for personal enrichment and revenge should this new monster be caught in the least supposedly irregular practice. Real irregular practices were not awaited but imaginary ones were seized upon and almost at once we found ourselves entangled in medicolegal problems which provided for us no special comfort. Thus it was that early recourse was had to the resources of our colleagues, the lawyers. Out of the contacts thus early made with the law school group, which were at first of material and very practical significance, grew a desire on the part of some of us in the School of Medicine to form a permanent association with the legal group for our mutual instruction. After many informal discussions of medical problems with legal aspects between ourselves and some of the staff members of the law school, a keen interest in our problems arose in the lawyers. The ground work was then set up for the

*Read in Section on Medical Education, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

*From the Department of Pathology, School of Medicine, and the Legal Aid Clinic, School of Law, Duke University.

development of a plan of mutual education which, while simple and elementary thus far in its development, has nevertheless proven useful and interesting to those who have been concerned with it.

At a meeting of a joint committee of the law school and the medical school, a series of general propositions was discussed in an attempt to evolve some cooperative plan which would be of benefit to both groups. Since whatever was to be done was to have no financial backing, all the participants being volunteer workers, it was of course necessary to evolve a plan the educational experience of which would afford a reasonable compensation. The discussion revolved about the following proposals:

(1) A series of formal lectures on medicolegal subjects, by members of the legal and medical staffs, open to staff and students of both schools.

(2) A series of legal trials involving actual or fabricated medicolegal questions, to be worked up and carried off in the law school moot court by students and staffs of the two schools.

(3) A series of formal round table discussions of medicolegal propositions worked out by the medical and legal staffs and open to students of the two schools.

(4) A series of joint informal discussions of current actual medicolegal problems as they might present themselves in the daily activities of the work of the two schools.

Our discussions of these propositions had not gone far when it was apparent that none of us had any very clear idea of the real essence and purpose of what we speak of glibly as medicolegal education; and when some light began to dawn upon the group we were not at all sure that what we wanted to concern ourselves with was medicolegal education in the sense of acquainting ourselves and our students with the propositions in law which concern the medical profession, or the propositions in medicine which are of importance in the daily practice of the lawyer. It was rather easy to see, as the discussion proceeded, that each group was little inclined to play the role of mere didactic instructor of the other group by expounding the law or the rule of practice in treatment governing cases which come from day to day to the office of the lawyer or the doctor. It was equally clear that there was a keen interest on the part of both groups in the theory of the law as it is applied to matters of a medical nature.

Thus was suggested very early in our talks the fundamental concept of a plan of operation which would have as its basic idea an investigation of the principles which lie at the bottom of the laws which governing bodies make for the protection of society against individuals, influences, conditions and circumstances upon which medical science and medical practice have very material bearing.

With this investigative idea prevailing among the contributors to our discussions, it was at once obvious that our first proposal, which involved the giving of a series of formal lectures by the two staffs for the purpose of expounding the law in relation to medical practice and vice versa, would not begin to provide what we hoped for. Such exercises would naturally concern themselves with didactic instruction of the opposite group in matters of the law or the science, a knowledge of which would save those concerned from embarrassment at the hands of one or the other groups in the course of practice of the respective professions. A procedure of this sort, while of the greatest practical usefulness, could hardly be spoken of as medicolegal education, but rather as medical education and legal education in parallel courses.

The very nature of the physician's profession as well as that of the lawyer is such as to put the two at loggerheads under the conditions of practice of their respective professions. Their first concern, therefore, is to protect themselves against each other either in the interests of themselves personally or in the interests of the persons whom they may represent. The doctor and the medical student are keenly desirous of being instructed in their rights and liabilities, while the lawyer craves information which may be useful to him in cross examination in order that his case may not suffer. Instruction of the lawyer in matters medical and the instruction of the physician in matters legal could, therefore, lead us nowhere in an attempt to bring together the two professions for a consolidated attack upon a problem of administration of justice. Nor could such a scheme contribute in any material way toward an understanding or a clarification of a proposition of law involving the complex problem of human relationships.

It is our impression that the proper education of the medical and legal professions must be of such a nature as to bring together the two minds for the solution of medicolegal tangles rather than of such a character as will make of them antagonists as we have just suggested. To accomplish this is indeed no easy problem since the two professions are fundamentally different in their viewpoint. The medical profession is at

bottom humanistic and individualistic in its relation to society. There are few rules laid down to govern its practices. It is concerned so much with the intimacies and privacies of personalities that it often finds itself in a position at variance with the order of society as it is established. The legal profession, on the contrary, is primarily concerned with the handling of human relationships according to definite rules and regulations which are set up by constituted authority for the protection of the whole rather than the individual of society. In the very right and honorable and legitimate practice of their respective professions the medical and legal minds must therefore be frequently at odds. If justice is to be served and truth uncovered under circumstances which owe their existence to these fundamental differences in viewpoint of the two professions it can be effected only by some form of approximation and by mutual understanding of the aims, practices, and principles of the two professions. Parallel lines of instruction fall short of accomplishing this end.

A second material objection to the formal lecture plan was a very obvious and practical one. Neither the lawyers nor the doctors could find justification for giving their time to an undertaking which could serve no other purpose than the personal profit of those to whom the lectures were given. Such information and instruction as would constitute the substance of the lectures could be obtained by any individual merely by consulting a doctor or lawyer, a procedure which would be naturally and universally followed whenever the circumstances required it.

As a means of mutual instruction and profit we could see no objection to the second proposition, the central idea of which is the series of moot court trials of fabricated or actual cases in which medicolegal questions are involved. On the contrary, we were impressed by the favorable possibilities which this procedure offered. It was proposed that this plan be used especially for the instruction of the students of the two schools since we proposed to have the students work out the problem, the staff acting as advisors or consultants. It was brought forward, however, that the plan offered very material opportunity for those members of the staff concerned to introduce into the trial from time to time as the case was developed discussions of the basic legal and medical principles conceived.

It was agreed that a plan of the sort just described would necessitate the development of a permanent organization of a medicolegal staff. Since our two new schools were still in the throes of organization, our joint committee felt that this plan of attack on the problem could best be postponed for the present.

The working out of a series of more or less formal round table discussions of medicolegal propositions presented more or less the same difficulties as the moot court plan, since we felt that such discussions could not be profitable without very careful preparation on the part of those in attendance and without a definite responsible leadership in the two groups. It was the consensus of opinion that this idea could very well be worked out in a less formal and more practical as well as less laborious way by the application of our energies to immediate problems with which one or the other group was concerned in the course of the routine activities of the two schools. Thus it was agreed to undertake a series of informal discussions of current medicolegal problems.

To this end we have worked out a very simple plan of consultations between the staff of the law school and that of the medical school somewhat as follows. The only organized responsibility which is required is placed in two group leaders, one in the medical school and one in the law school. The selection of these group leaders has depended entirely upon the individual's interest in the problem which we all regard as nothing more than an experiment. At present Mr. Bradway and I have undertaken to carry on the more or less formal arrangements which are necessary for the functioning of the plan. It so happens that the two of us represent departments in the two schools which are for the moment at least most concerned with current medicolegal problems. Mr. Bradway's position in the law school as Director of the Legal Aid Clinic has brought him constantly in contact with real legal problems, and thus there comes into his hands almost daily material which is adaptable to our plan of discussion. Our own department (Pathology) in the School of Medicine of course is a sort of center of attraction of medicolegal difficulties. This is especially true since there is still a widespread prevalence of the view that the pathologist's principle excuse for existence is the solving by postmortem examination of the community death mysteries.

As questions of a medicolegal nature arise from time to time in the routine work of the medical and legal staffs which will lend themselves to profitable discussion, they are taken under consideration by the group chairmen and a con-

ference is planned. The problem is as a rule made known to the entire staff of both schools. In order that the discussion may not be too haphazard, and in order that a profitable discussion may be assured, the group chairmen select from among their respective groups those staff members who will be most apt to be prepared to contribute pertinent data by reason of their work in the field of medicine or law to which they devote their major efforts, and request that they be present and assume the burden of the discussion when the joint meeting of the two staffs is called. At the appointed time the two groups go into session. The problem is presented by that group in whose work it has arisen, after which the discussion proceeds in a most informal and open way.

Our experience with this undertaking thus far is indeed limited, since we have carried out only two discussions. One of the sessions concerned itself with the problem of sterilization of a young woman about whom there was some question as to the mental status. At the other was presented the problem of paternity in a case of an illegitimate child.

It does not appear appropriate at this time to try to analyze our experiences with our new project since that experience is too meager. It would be equally out of place to try to estimate the value of these conferences. A prolonged experience is obviously necessary before any attempt should be made to evaluate the undertaking as a means of medicolegal investigation. Two things we do feel, however, quite justified in saying. In the first place, we learned even from the very first meeting that there is an enormous gulf between the legal and medical viewpoints of almost any question that may be brought forward by either group. Secondly, our thoughts have been sufficiently disturbed by our legal or medical questioning to arouse keen interest in further similar attempts to investigate medicolegal problems. Although we can draw no conclusions from our limited experiences with this plan, we feel that we can make at least one prophecy. That is, that until medical minds shall take the time, make the opportunity for and ponder the results of coordinated studies of a sort at least somewhat similar to that which we have undertaken, there can be expected hardly more than petty advances in our conception of medicolegal principles.

An argument in defense of our scheme is not in order here. We merely put it forward as an experiment. We ourselves already are aware of some of its faults and some of its virtues. As with all experiments, we are not very much concerned with the eventual outcome. Whether it works or not is not so important to us as is the fact that we are learning in the course of its development.

SURGICAL TEACHING: THE HOSPITAL PERIOD*

By EDWIN P. LEHMAN, B.A., M.D.,
University, Va.

I am to speak on a phase of the education of the surgeon. To dare to approach a subdivision of the broad field of education in these days of changing standards and methods requires some degree of temerity, particularly in one whose principles applied to the practical work of training surgeons have yet hardly been subjected to the test of time. In perhaps no other subdivision should the word of the elders have greater weight, of the surgical teachers whose success through years of effort, may be measured by the steady excellence of their product. And yet there is some excuse for those of us whose aspirations may be hoped to bring to us a degree of such success as years go by, to discuss the pressing problems of our job. We are usually compounded of several schools, deriving our inspiration and our ideas from varied sources; and there may be some new power in the blend. Furthermore, we are closer to our own period of training, more alert to its excellence and its defects. And lastly, it is essential for the clarifying of our own ideas that we have the opportunity to express them and to subject them to the criticism of our colleagues. After all, the training of men is our job, the thing closest to our hearts, and therefore the thing beyond all else worthy of discussion.

The making of the individual surgeon has many phases, beginning far back among his forbears, passing through the periods of primary, secondary and collegiate education, the period of specific medical education as an undergraduate, the period of even more specific hospital and laboratory training in the narrower field of surgery, and ending with the long life time of learning that the honest practice of a splendid vocation imposes. It is the penultimate of

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*From the Department of Surgery and Gynecology, University of Virginia School of Medicine.

these phases that I intend to discuss, the period of training in the hospital and laboratory during which the individual should develop from relatively raw material to a product cast in a fitting mold, still rough-cast perhaps, but needing only the friction of daily activity to become smooth and burnished.

Let us examine first the material that comes to us in the intern, weighing the motives that animate him, the ideals he possesses, the background and training that have made him. Let us then see what our own ideals may be of the finished product, the man whom we are willing to see step forth from under the academic wing with our seal upon him, as a surgeon fit to accept the responsibilities of that most responsible of callings. Finally, let us examine the logical steps that must be taken to lead the individual from the former state into the latter. Although the man whose aspirations and personality lead him toward surgery, but whose time and money prevent free choice of methods of training, presents often a vexing and discouraging problem, we cannot here discuss it. We must limit ourselves to the ideal. What should we endeavor in all cases to give a man who wants to be a surgeon?

Those manifold things that characterize surgery as distinct from the qualities inherent in the practice of all branches of medicine make their appeal to varied sorts of men. The medical student looks forward to the permanent devotion of his career to surgery from motives often unexpressed. Occasionally opportunism guides him; he is bent towards surgery because a surgical internship happens to be open to him. If this exposure to surgery wakens enthusiasm, then what will be said later applies equally to him. If no real interest is born, then we need not discuss him further. We need also waste no thought on the man who enters surgery for its financial recompense alone or for its drama alone. In neither type of man may self-critical honesty be expected.

Given the appeal of the general field of medicine by virtue of its compassion, its dignity and its demand for a particular type of intellectual activity, one can descry three special characteristics of surgery the influence of which is valid. Surgery appeals in the first place to the man with a love of handicraft, the man whose childhood was clearly marked by delight in the use of his hands. Given less intellectual eagerness and capacity, he might become an artisan. Given less compassion, or an otherwise different slant, he might become a physicist or an engineer. In surgery he finds the satisfaction of mental activity at its highest pressure together with a demand for the more primitive satisfaction of manual dexterity, the whole built up on the emotional background of the humanitarian.

The second prime appeal of surgery is to the man whose curiosity and courage demand an immediate check on his intellectual processes. The surgeon has the objective confirmation or disproof of clinical diagnosis that the laboratory affords the internist, and he has in addition the confirmation or disproof of his eyes and his hands at the operating table. He is rejoiced to be proven right, regretful if he is proven wrong; but at least he is furnished in most instances an answer to his questioning.

The third appeal of surgery lies in positiveness of action. If the surgeon sees surgical disease, he can intervene, he can influence by his own activity the natural course of events. To do something, with strong emphasis on the penultimate word, means much to the surgical mind. Unfortunately it has often meant too much; but for the present I am not discussing the surgeon's failings or his failures. I am attempting only to outline those elements in surgery that draw men of a particular make-up to its practice. To the surgeon's type of mind, there is in those three conditions of labor an important element of satisfaction.

These, then, are the forces that drive the man to surgery whom heredity and environment have first carried into the study of medicine. We see now his motivation. Let us inquire next into the intellectual and technical attainments that his training up to the critical moment of his doctorate has given him. He is from twenty-three to twenty-six years of age. His turbulent adolescence is well behind him; his emotional life is beginning to be disciplined. His outlook has developed to its first opening perspective. He begins to know on some rational basis what he wants and how to direct his steps with some certainty towards his goal. He has, we will assume, a normal impulse to explore the unknown; manners, time, health, energy. Let us hope that he has also a general introduction to the intellectual world aside from his specific scientific knowledge, enough at least on which to build an avocation or base a hobby, and certainly enough to permit him to relate his special field to general tendencies of thought.

He has had a moderate knowledge of the preclinical sciences, and retains, in addition to a scattering of information, an insight into their specific problems and a beginning real sense of

their bearing on practical medicine. He knows an enormous number of facts in clinical medicine, and has only the germ of a knowledge of their relationship and application. He knows almost nothing of the practical psychological handling of the patient, although his approach is not yet crystallized in a bad mold born of bad example. He has no technical abilities beyond those that the simplest procedures demand, such as venepuncture and the use of the dressing carriage. There is doubt as to how well he knows how to use his mind, which we will assume to be a tool of temper better than the average. He may or may not be an accurate observer; he may or may not be able to reason from his observations. He is certainly only vaguely aware of the history and literature of surgery; he may or may not be expert in running down a subject. He may or may not have formed the habit of current reading. Above all, he is eager to learn.

From this material we must make the surgeon. Our candidate must grow in knowledge of clinical medicine by constant and intimate contact with the patient until his abilities as a clinician are established. This is the first and the most important essential. He must be gradually led into technical proficiency until the most unexpected pathological finding or the most appalling operative catastrophe will find him rationally sure of himself and at ease. His workmanship must have finish, perhaps beauty; his manipulations a degree of sureness, order and grace. He must have grown during his hospital years in knowledge of the fundamental medical sciences and their relationship to the surgical patient. He must have had opportunity to develop his knowledge of surgical literature and he must have become a confirmed reader of current journals. It is well that he knows firsthand the difficulties of laboratory investigation, the proper insistence on controls, the dangers of deduction, in order later justly to evaluate the great body of reports of investigations that will come to his eye. He must have traced back to original sources at least one subject, so that here, too, he may know how it is done and what difficulties beset library research. He must have developed by these two experiences tools whereby, given opportunity, his urge for explaining the obscure and exploring the unknown may find expression. He must have had some experience with teaching. Lastly, he must have learned the skillful psychological habits of the practitioner.

This is a task of major size to crowd into any fixed period of years. We must agree that the task is never completed in any individual instance. The busy years of later independent activity will carry it on towards an end that should never be reached. Our fundamental duty is to prepare a soil in which growth, continuous and steady, is possible.

The years of hospital and laboratory training embodying the above ideals are not easy to organize or define. In the allotted time it is not possible to discuss at any great length the case for and against controversial matters, nor to quote opinion. I shall attempt only to present what has seemed to me a satisfactory method of attacking the problem of the education of the surgeon.

In considering the total time of hospital training, we encounter at once a difficult decision. Capacity for learning varies widely. An occasional man may become a real surgeon almost self-taught. An older generation of surgeons who laid the cornerstones of our modern structure testify to that fact. There should be, however, some minimum exposure to training from which the average man can profit. I believe that four years of clinical contact, the last of which is marked by great responsibility and the opportunity under guidance for independent judgment and operative activity, together with a year devoted to the library and the laboratory, should suffice. I believe in no cast-iron rule. I would try to organize my clinic so that the exceptional man might leave the nest earlier; or that the man whose progress has been slower might profit from a longer training. In general, I am not in sympathy with the prolonged residency extending over more than two years. Its advantage lies in the smooth running of the clinic; its disadvantage in that unmistakable psychological reaction on the man that goes by the name of "hospitalization." In addition it tends to discourage the aspirations of younger men in training by shutting them off from the rewards of their earlier faithfulness. It may even thereby react against the appeal of the institution as a desirable one for surgical experience.

At the end of five years of training, I believe that a well-endowed man is capable of approaching any common surgical situation with familiarity and any uncommon one with ingenuity, resource and safety to the patient. I believe, further, that he is then capable of self-training, continuous intellectual and technical growth.

How next must his time be divided during his five years? Much is said of the desirability of a year of general medicine before the surgical internship. I am one to recognize its value, who have felt the lack of such a year in my own development. On the other hand, the surgical clinic should be so organized and so conducted that the lack of a medical internship need not be too keenly felt. It should in effect be a clinic in internal medicine up to the moment when preparation for operation begins. Diagnostic study should be as complete as on the medical wards, alternative methods of treatment should be as widely discussed and the psychological aspects of disease should be as intelligently handled. If these ideals are attained, then the intern is in a sense obtaining the benefits of both medical and surgical training. He deals, it is true, with a different class of material, a class of material with which as a surgeon he will always deal. His great lack will be that of prolonged intimate contact with the point of view of the internist. I am eager to appoint men to my service who have had medical training; but I am unwilling to sacrifice a year of my minimum period. If a graduate from a medical internship joins my staff, he must, except under unusual circumstances, be prepared for five years of surgical training. This is not handicapping the better prepared man; it is rather offering him the greater opportunity. If I find that a student can afford no more than five years, I advise him to apply for a surgical internship. If I can persuade him to take six, I send him to medicine. Unquestionably in the rush of a busy surgical service, the placid approach to disease of the internist cannot always be approximated. I am speaking only of what we should try to do.

Of the five years devoted to surgery, one must be spent in the laboratory, of which more will be said later. The other four years must be devoted to contact with the patient in the wards, the dispensary and the emergency room, four years of gradually increasing responsibility. The necessity for a wide knowledge of pathology and clinical surgery before operative responsibility is undertaken is an axiom of modern surgical training that needs no comment here. It is obvious, therefore, that I believe in the graduated resident system.

The resident is a man who has been in constant clinical activity for three years, as intern and as assistant resident, and who has had the laboratory year as well. He must be regarded as the apex of the educational pyramid, the man to whom all available ward material, exclusive of that needed by the visiting staff, should be turned over. And for his sake, the amount needed by the visiting staff should be limited to that demanded by teaching or by research. The rare and the more difficult cases should not go to him, except occasionally towards the end of his year. Although he should be given great responsibility and the widest opportunity for the exercise of his judgment, he should never be given a free hand. The older man on the ward service must take the ultimate responsibility, which means that he must see all but the most clear-cut cases, must agree to operative indications and methods, and must be certain that operative treatment is successfully carried out. In many instances he must serve as first assistant.

If we regard the resident as the apex of the educational pyramid, we must from another point of view regard him as the most important cog in the hospital teaching wheel. He is the man from whom the intern gets his first conception of ward detail, the treatment of the minor complaint, the handling of the complication, the care of the patient's physical and emotional comfort, the care and dressing of wounds. His rounds each day with interns and assistant residents are teaching rounds. In addition he guides the first clumsy manipulations of his juniors at the operating table. The intern must learn the technic of the minor operation from him; the assistant resident is put through an occasional herniotomy or appendectomy with him across the table. The observant junior learns much operative surgery from observation, but he learns most with the scalpel in his hand. And the resident is responsible that he learns correct methods and that the patient does not suffer. Although the executive details of the house staff organization are in his hands, teaching by precept and example is by far the weightiest of his responsibilities.

It is obvious that the resident must be chosen for unusual qualities; and it is only to the man of unusual qualities that such opportunities should be afforded.

During the first three years of the hospital training, constantly increasing responsibility must be given, leading up to the time when the senior assistant resident can step into the residency prepared to carry its load. This means that at some time during the second year of training, major surgery under the resident's immediate supervision must begin. During the third year this must continue, the resident yielding more and more responsibility to the senior

assistant resident. The time will come when the resident may supervise without scrubbing up, and later when he may only be on call, leaving the conduct of the operation entirely in the hands of his junior. Always, it need not be said, the safety of the patient comes first. Such sole responsibility should never be delegated without the consent of the chief of staff. Only if such responsibility is wisely delegated, will the proper development of the junior man continue to the point at which he becomes capable of assuming the duties of the residency.. During this period of gradually increasing technical opportunity he is of course always in contact with the patient, both in the private and public wards, perfecting his knowledge of disease and of the sick individual. He, also, is teaching, handing down to the man immediately beneath him what he himself has learned in his brief experience.

I have discussed the graduated system from the point of view of its educational value. I need hardly add that the value to the patient, particularly in the close supervision, that it affords, of the work of the beginner, is its most important attribute.

It is perhaps noticeable that I have had much to say about technical training and relatively little about opportunities for development of fundamental knowledge of clinical medicine. There have been several reasons for this apparent disproportion. Operating does not make the surgeon; this is a truism that modern pronouncements of surgery have emphasized and reemphasized. But a lack of technical training and skill also prevents a man from being a surgeon. There must be a just proportion in training between the factors that develop knowledge of disease and those that develop what so often is called "merely technical facility." The latter alone is unquestionably more dangerous than the former alone. It is my feeling, perhaps unjustified, that there is a tendency for surgical teaching to swing too far away from the aim of technical efficiency. It is good for a surgeon to be a proficient physiologist or pathologist or biochemist, or internist, but after all surgery adds to such cultures a handicraft. And the operator without craftsmanship is also no surgeon. The surgery of craftsmanship alone has had its day. We have heard much sound talk in recent years about the other requisites that a surgeon needs. Let us not forget in our zeal to teach men why and when surgical treatment is needed, that they must also know how it is to be administered, and know it with sufficient experience behind them so that at the operating table their mental and physical status is one of familiar ease. For these reasons I have, perhaps, overemphasized the technical necessities in surgical training. Even if the warning is not needed, it offers at least a note not often heard in present day discussions of the subject.

The laboratory year of the five-year period denies over-emphasis on the technical. Here it is that the student of surgery returns to his fundamentals. It should be spent completely aloof from clinical duties. It is a year of scholarship and contemplation. For practical purposes it should include a thorough experience with the gross and microscopic pathology of surgical disease, although an equally intensive experience with a branch of physiology or of biochemistry might be substituted. It should include the independent investigation of some problem in laboratory research, with the attendant ferreting out of the subject in the library. The habit of current reading must be established. During this year, then, the student gets much that the active clinical years cannot give him. It is difficult for the man with ward responsibility to find time for more than the reading that his current case material demands. I cannot conscientiously stimulate the house man towards laboratory research. It has been my experience that in most instances either the patient suffers or the laboratory languishes unentered. I do not discourage the man who wants to combine the two. But the rule must be that the clinic always comes first. During the laboratory year these lacks of opportunity are remedied.

The laboratory year should come just preceding the residency. Three years of clinical contacts have shown the student what he does not know and whither his interests tend. His perspective has begun to develop to a point which enables his time for contemplation to be profitably employed on the obscure and puzzling in his previous experience. He may have picked up from his contact with patients a specific problem that has engaged his curiosity and stimulated his investigative interest. Lastly, he is removed by one year from the hospital procession. He is by that one extra year senior to his fellows, an object of greater respect, a little more of an oracle, than if he had progressed directly from his assistant residency to his residency. This sequestration for a year makes him more authoritative, a better disciplinarian, a more effective teacher.

In effect this year away from the bustle and rush of hospital practice with its habit of in-

stant occasions and its demand for perilous experiment, is a year for thought, a year for the individual to relate himself rationally to his calling, to acquire the manner of scholarship. It is much to ask of a single year, and yet much towards these ends is accomplished. When he comes back to the wards for his residency, it is astonishing what professional maturity he displays. I would hesitate to appoint a resident who had not been subjected to this quiet year with the microscope and the written word.

The final comment is perhaps the most important. The influence of the chief of clinic and of his associates is the keystone of the arch. There must be a real quality of selflessness among them. They must yield again and again to the younger man, relinquishing interesting clinical opportunities for the sake of developing his abilities. They must devote their time without stint when it is asked of them. The resident must know that his chief will come to his side day or night ungrudgingly and with ready aid. To carry out these ideals, the senior staff must be thoroughly imbued with the love of teaching. Each case should call forth experienced comment. The operation should be a running dissertation on pathology, symptomatology, the why and how of technical procedures. The most junior man must realize that the simplest question will be met with sympathetic attention and a genuine desire to enlighten. The unforgivable sin of the visiting man is to place his personal interests, his income, his convenience, his prestige, above the duties of teaching and help that he owes to his junior. Only so can the men who give a teaching clinic its essential character justify their appointments. It is their greatest responsibility next to their duty to the sick, and in the same sense it should be their keenest joy.

A surgeon is never a completed product. The hospital and laboratory phase of his training is the beginning only. The brief that I have presented has no element of originality. It is, however, a practical outline, and if not adhered to with too great rigidity, will, I believe, develop men to the point where self-development can begin with safety to the patient.

DISCUSSION (*Abstract*)

Dr. R. S. Cunningham, Nashville, Tenn.—I do not feel that the fixed assignment of one year in the laboratory, including research, is in itself an unwise procedure, if this is the only possible method of giving a young individual in medicine an introduction to research. If one assumes that the year for laboratory work is arranged as Dr. Lehman has described, I believe that, when an assistant resident is ready for his year, his preferences should be consulted, and if he prefers clinical work to research, he should be given the opportunity of substituting clinical duties for the time which otherwise would be devoted to research. Some other member of the staff, who wanted time for research, could be allowed to share the free time which would thus be available. I am firmly convinced that a single specific year, completely isolated from all other opportunities for research, is often insufficient to bring about the necessary preparation and development for a research career, and will therefore, frequently discourage the individual concerned from returning at a later date to further efforts in investigation. I therefore feel that one should consider research as an integral and continuous part of the medical life of the student, the house officer, and the member of a full time department.

Dr. Wiley D. Forbus, Durham, N. C.—We have a plan under consideration now at the Duke Medical School and the Duke Hospital, wherein there is provided for the training of the surgical resident a year's sojourn in the Department of Pathology as a member of that staff and without any surgical duties. The place provides a special training for this man with the pathological material which comes from the operating rooms, in addition to a general experience in general pathological work. It is required that he contribute also quite materially in the routine teaching activities of the Department of Pathology. Our plan provides for this training in the second year of hospital service. We should be interested to know why Dr. Lehman prefers the year preceding the surgeon's residency.

FRACTURES OF THE ELBOW*

By W. W. HARPER, M.D.,
Selma, Ala.

Fractures of the elbow are of frequent occurrence and they not infrequently cause the surgical attendant many anxious moments.

With the exception of fractures of the olecranon process, all fractures of the elbow should be treated in acute flexion. Under a general anesthetic the fracture is reduced by flexing the forearm acutely on the arm; and this position is maintained by means of an adhesive strip.

If the patient is to remain in the hospital all will be well, because there can be frequent observations and the flexion can be lessened upon the first sign of circulatory disturbance in the forearm. If the patient is to go home, the parent or other attendant should be given written instructions to cut the dressing if the fingers be-

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come pale or purple or if there is complaint of anesthesia or paresthesia.

If the patient is not seen for several hours after the injury there may be such marked swelling of the elbow that it will be impossible to flex the arm. In this case the elbow is put at rest until the swelling has subsided, when the fracture is fixed in flexion; but the flexion should always be short of obstructing the circulation. The principle thought in the mind of the surgeon should be that a few hours of obstructed circulation will lead to a permanent ischemic paralysis.

As the swelling subsides the flexion is increased until it is complete.

The after-treatment of these injuries is extremely important, and in this treatment I have followed the teaching of Sir Robert Jones, of Liverpool.

After maintaining acute flexion for two weeks the forearm is dropped ten degrees and the patient allowed to exercise the forearm in that arc. In two weeks more the arm is dropped ten degrees farther and the patient is told to exercise as fully as the dressing will permit. If, at the end of two more weeks, the patient can carry out these exercises without pain, the dressing is removed and the patient allowed to carry his arm in a sling. Several times during the day the forearm is removed from the sling and active movements are practiced to the point of pain tolerance.

If, at the end of three months from the beginning of treatment, the patient is unable completely to extend the forearm, the surgeon may give a general anesthetic and break up the remaining adhesions.

I shall now exhibit a few lantern slides, showing the end result of two fractures of recent occurrence.

DISCUSSION (*Abstract*)

Dr. J. S. Turberville, Century, Fla.—The majority of these fractures, particularly the supracondylar type, should be treated by acute flexion at the elbow (Jones position). Most cases of olecranon fracture should be treated in the extended position. However, there is an exception in either instance. In the case of the humerus where the fracture is produced in the classical way, namely, by hyperextension, and consequent fracture by tearing the periosteum on the anterior surface (that on the posterior surface usually remaining intact), acute flexion of the elbow is the ideal treatment if the fragments are correctly replaced. On the other hand, if the fracture is produced by falling on the elbow or in some other way so that the periosteum is torn across the posterior aspect of the humerus, acute flexion exaggerates the deformity, as you can readily understand. In one of Dr. Harper's pictures where reduction was not complete, the intact periosteum is seen on the posterior aspect of the humerus filling in with bony tissue. The reason that acute flexion is the correct position in the classical deformity is that the inelastic periosteum on the posterior surface acts as a splint when the elbow is acutely flexed. If the periosteum is torn on the back there is no resistance to the bend which is in the fracture as well as in the elbow joint.

In olecranon fractures if the fracture site is not flush with the lower end of the humerus, the correct position is in extension. If it is flush with the lower end of the humerus, acute flexion is the correct position. Extension in the latter will cause the lower fragment of the ulna to kick forward on a plane anterior to the upper fragment and consequently on a plane with that of the humerus or even anterior to it. If union takes place in this position there will be locking of the elbow.

Dr. Edward T. Newell, Chattanooga, Tenn.—Dr. Harper stresses the fact that if elbow fractures are not taken care of properly and promptly, serious pathological conditions will develop in the muscle sheath and tendons, producing ischemia, which is much more to be dreaded than the deformity that might occur from improper approximation of the bony fragments.

Frequently we see a child who has fallen out of a tree with weight on the hand, with the classical backward displacement of the distal fragment, and with the sharp point of the proximal fragment impinging against the blood vessels at the bend of the elbow, producing in a short time great swelling, edema, discoloration and blebs, forecasting an early Volkman's contracture.

Cases of this kind require open operation. This is very easily, quickly and simply done by making an incision over the posterior surface of the elbow, exposing the fracture line, accurately approximating the fragments, holding them in place with heavy 20-day catgut (doubled) or kangaroo tendon, with the addition of a well placed anterior and posterior molded plaster-of-Paris splint.

If too much trauma has not occurred and there is very little swelling, the simple Jones position, acute flexion, the arm held in place with adhesive plaster with addition of a sling, is all that is needed. The Jones position approximates the fragments, but it does not take into consideration the soft parts, and in all fracture work the soft parts should have precedence over the bony structures. If you put a severely traumatized fractured elbow that has great swelling in the Jones position and hold it there, you will in the majority of cases cut off the circulation to the arm, hand and fingers distal to the elbow and will most certainly court disaster. In all cases of elbow fractures where we attempt to use the Jones method we must ascertain before completing the dressing that the circulation is not obstructed.

THE PALATINE TONSILS*

SOME REMARKS CONCERNING THEIR SURGICAL REMOVAL

By J. D. THOMPSON, M.D.,
Port Arthur, Tex.

In presenting the subject of this paper, it is not my intention to try and advance anything radically new, but to offer in as condensed a form as possible the opinion of several writers on the subject, and to add a few of my own ideas and methods which have proven successful in my hands.

The faucial tonsils are masses of lymphoid tissue situated one on either side of the oral pharynx, being set in the sinus tonsillaris or tonsil fossae. The free surface of the tonsil is covered by a mucous membrane containing crypts from which numerous follicles extend into the substance of the tonsil. The attached portion is adherent to a fibrous capsule which is separated from the superior constrictor muscle of the pharynx by loose connective tissue.

According to St. Clair Thomson and others, development of the palatine tonsil begins about the fourth month of fetal life. They vary greatly in size, usually being best developed in childhood, undergoing retrogressive changes after puberty.

Most authors classify palatine tonsils as pedunculated and submerged. To be more specific, we might add two other types to this classification: the small tonsil which is well within the fossa but not embedded, and the large tonsil having no pedicle base, which is necessary to bring it in the class of the pedunculated type.

Many theories have been advanced as to the functions of the tonsils, but it seems doubtful that any one of them has been definitely proven. Drainage has been especially mentioned. Ashhurst believes the tonsils serve as a means of eliminating various endogenous toxins during acute infectious diseases.

Masini claims that the tonsil has an internal secretion, its function being similar to that of the suprarenal gland in the elevation of blood pressure.

Immunization is mentioned as a function. It has been claimed that the tonsil acts as a culture tube, receiving germs from the mouth and discharging them as a vaccination to the body. Oppel thinks that the tonsil is a blood forming organ, since lymphocytes are produced in its germinal centers. Others claim that it has a protective function, acting as a filter in the lymphatic drainage system.

Birkett believes the tonsils serve as a first line defense against bacterial invasion, the second line being established by the lymph nodes.

INDICATIONS FOR REMOVAL OF TONSILS

Frequent attacks of acute tonsillitis; otitis media, especially in children, in whom the adenoids should also be removed; endocarditis; neuritis; enlarged tonsils that are causing mechanical obstruction to respiration; diphtheria carrying tonsils; chronic enlarged cervical lymph nodes, especially those near the angles of the jaw, recurring tonsillar, or peritonsillar abscess, are indications for tonsillectomy. Rheumatism and general toxic conditions where the tonsils are diseased are also indications.

Tonsils are very deceptive in appearance. In many cases it taxes the skill of the laryngologist to determine definitely whether or not a tonsil is causing trouble. A small tonsil often causes more systemic infection than the larger one.

CONTRAINDICATIONS TO REMOVAL OF TONSILS

A marked degree of anemia, and age, are contraindications to removal. Only in case of some ailment the cause of which can be definitely associated with the tonsils should they be removed in a child under two years of age or an adult over sixty.

Pregnancy and the menstrual period are not always absolute contraindications. I have found it necessary in a number of cases to remove the tonsils, both under local and general anesthesia, during the menstrual period and in the early months of pregnancy, and have observed no bad results. Local anesthesia is to be preferred in these cases, since a general anesthetic is more liable to cause a disturbance than the operation.

Tonsils should never be removed in the presence of a tonsillar or peritonsillar abscess.

Patients with trained voices and public speakers should be apprised of the possible deleterious effect upon the voice following tonsillectomy.

Hemorrhage is the one dread in cases of hypertension. However, I have met with only the usual amount of bleeding in such patients and have operated upon a number of patients whose blood pressure ranged from 150 to 200.

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

PREPARATION OF PATIENT

The patient's general condition is to be noted, especially for the presence of any acute infection. The heart, lungs and kidneys should be examined, more for the patient's protection against the anesthetic than the operation. The patient is allowed nothing to eat or drink the morning of the operation if general anesthesia is to be administered.

I seldom do a coagulation test except in families where there is suspicion of hemophilia. Occasionally I put an adult patient on calcium lactate or some other accepted calcium preparation for a few days prior to operation. In some cases, I have administered subcutaneously 1 to 2 c. c. of fibrogen thirty minutes before operation, but this is not a routine practice.

It is a safe practice to do a coagulation test in all operative cases, as it will prove whether or not we are dealing with a hemophilia; but for the cases coming within the time limit it offers no specific information as to who will bleed more at the time of operation or who may be more likely to have a secondary hemorrhage. A patient with a three-minute time test is just as subject to either a primary or secondary bleeding as one with a much longer time.

After entering private practice in this special field of work I operated for ten years without doing a coagulation test. During this time I had occasion to suture only one patient for secondary hemorrhage. This was a young woman, some five hours following operation. The patient had very little primary bleeding. Since that time I have not used a suture for the control of a secondary hemorrhage.

I have sutured only one tonsil in over seven years, either at the time of operation or later. This was three years ago in a young girl, 18 years of age, under general anesthesia. I have never had to suture for a hemorrhage following the use of local anesthesia. In my 17 years' experience in this work, like all throat specialists, I have been called to deal with quite a few secondary bleeders. I believe I voice the general sentiment of laryngologists when I say that hemorrhage is our greatest bane in tonsil operations.

In many cases it is days before the patient is safe from a secondary hemorrhage. I have been called to stop bleeding as late as the eleventh day after operation. A secondary hemorrhage may occur any time after operation, but should it not come on within the first twenty-four hours. In my experience it generally occurs about the fifth or sixth day. It is then caused, of course, by erosion or sloughing.

CONTROL OF HEMORRHAGE

I use very few sponges at the time of operation, but should there occur more than the usual amount of bleeding, I dry the fossa with a sponge until I locate the point of bleeding. Then with a long hemostat forcep I simply crush the bleeder instead of suturing. This has proven just as effective, in my hands, in stopping the bleeding and preventing a secondary hemorrhage as if a suture had been used, and it is not so liable to be followed by infection.

When dealing with a secondary hemorrhage, I first remove any blood clot that may be in the tonsil fossa, then with a sponge saturated with epinephrine chloride, held in place with a sponge holder, I make firm pressure in the fossa, at the same time making counter pressure just below the angle of the jaw. A repetition of this procedure a few times will check almost any case of late bleeding. In some cases I have administered 2 c. c. of a fibrinogen preparation or hemostatic serum subcutaneously, repeated in 4 to 6 hours where necessary. Occasionally, an organized clot may form in the fossa and the hemorrhage cease, but as a rule the bleeding will continue as long as the clot is present.

Removal of the tonsils appears to be one of the oldest surgical operations on record. Hippocrates advised evulsion of the tonsils as early as 460 B. C. Celsus, a celebrated Roman physician in the tenth year of our era, removed tonsils by finger dissection and by pulling them from the fossa and cutting them off with a sharp instrument.

Fortunately for the present day laryngologist, great advancement has been made since that time, not only in the method of operation, but in the instruments devised for it.

Tonsillotomy and tonsillectomy are the two recognized operations. Laryngologists of America seem fairly well agreed that tonsillectomy is the preferred operation, the one aim being the complete removal of the tonsil, regardless of the type of operation selected.

We should endeavor to leave no part of the tonsil behind, as, no doubt, we all have experienced some of the troubles that may follow where only a small fragment remains.

Many methods have been devised for the removal of tonsils. Some operators prefer some form of dissection, using either sharp or semi-sharp instruments, while many others prefer the Sluder method or some modification of it.

Personally, I much prefer the Beck instrument, using it under both general and local anesthesia, except in very rare cases. My technic is the same in either case, the only difference being the position of the patient and the type of anesthesia used.

After entering private practice, I adhered to the dissecting method for some two years when operating under local anesthesia. I had been taught that the Beck instrument could not be used successfully in such cases. Being convinced that I was fairly proficient with this instrument when operating under general anesthesia, I decided to use it under local. My first attempt proved successful and I have continued its use since.

When I meet with a case in which I find difficulty in engaging the tonsil, I use a method which, so far as I know, is original. I thread a tonsil forcep through the Beck loop. After grasping the tonsil, I have my assistant make traction on the forcep, pulling toward the median line of the throat. While this is being done, I force the tonsil through the loop by making pressure on the anterior pillar in the usual manner. This traction makes it much easier to dislodge the tonsil from the fossa and renders dissection unnecessary.

I prefer the Beck instrument to any form of dissection. With this method the operation is bloodless until the tonsil has been removed. In dissection the field of operation is greatly obscured by the presence of blood and saliva. These, with the necessary lowering of the patient's head, are a great handicap to the operator.

All my local operations are performed in the office with the patient sitting upright in the treatment chair. I allow the patient to go home when the operation is completed and the bleeding checked.

Only one tonsil is anesthetized at a time. The anesthesia consists of 5 per cent butyn, 1 per cent novocaine and epinephrine chloride. I use 5 per cent butyn as a topical application to most of the pharynx, especially along the junction of the anterior and posterior pillars with the tonsil. After the patient feels a sensation of swelling in the throat, I make an injection of about 2.5 drams of 1 per cent novocaine to which is added 2 minims of epinephrine chloride. Half this amount is injected about half way from the top to the bottom of the tonsil, one-fourth at the base, and the remaining portion at the top. I introduce a needle between the tonsil and the anterior pillar. After the needle is introduced part way, the syringe is brought around at right angles with the axis of the tonsil, using it as a retractor to force the faucial pillar to one side. In this position the needle is introduced full length, or until well around the tonsil. I attempt to place the solution between the tonsil and the muscles. This has a tendency to float or force the tonsil out of its bed, and I find the injection made in this location produces more complete anesthesia and is less painful to the patient.

I try to avoid direct injection of the tonsil or the pillars. I wait 5 to 6 minutes after the last injection before removing the tonsil. After bleeding from the first side has subsided, the second tonsil is dealt with in like manner. If there should remain any portion of the tonsil, which may occur, especially at the base, one removes it with a Pierce-Mueller snare, after making traction on it with a tonsil forcep.

Local anesthesia is preferred when operating upon adult patients. I find it much easier on the patient, as well as the operator. Very few adult patients are subjected to general anesthesia in my practice. I operate upon all children under general anesthesia.

Under general, the patient is placed on the operating table in a recumbent position. I insist on complete relaxation of the patient that the pharyngeal reflexes may be abolished.

Some operators differ with me on this point, stressing the greater danger of aspirating infectious material into the lungs, causing pneumonia or lung abscess. This, in my opinion, can usually be prevented by diligent use of the suction machine.

The anesthesia consists of ether by the drop method until the patient is relaxed. The mask is then dispensed with and the vapor, by means of an electrically driven motor pump, is carried to the patient through a rubber tube, to the end of which is attached a metal tip, curved so as to be self-retaining in the cheek. This affords the operator an unobstructed view of the field of operation. The use of the ether vapor in this manner, I believe, is quite generally used today by most operators.

AFTER CARE OF PATIENT

Differing from many operators, I allow my patients to have water as soon as they come from under the influence of the anesthetic. Some claim that this will induce emesis, which may cause a hemorrhage. I have followed this practice consistently for a number of years and have had no bleeding. If the water is retained,

it will prove very refreshing to the patient. Should the patient vomit, it simply frees the stomach of any retained blood, allays nausea and can do no harm. I never elevate the foot of the bed, as some operators do. I believe this position is more conducive to hemorrhage, as it naturally causes a rush of blood to the head.

I keep the patient in bed for two or three days, allowing only liquids for the first two days. I prescribe an ice collar for a few hours for adult patients.

Most operators confine their patients strictly to a cold liquid diet, fearing that anything warm may cause a bleeding. In recent years, after a few hours, I allow my patients to have warm liquids, as I have observed in many cases that they are much more soothing to the throat. Cold liquids in many cases cause pain. I have never had a hemorrhage following this practice.

Beginning on the second day, I make an application of 5 per cent mercurochrome or tincture of iodine to the fossae. As an earlier treatment acetylsalicylic acid in powdered form or dissolved in water affords relief from soreness and pain.

SUMMARY

(1) The operator should adhere to the method best suited to his technic and with which he achieves best results.

(2) In my personal experience, suturing for control of hemorrhage following removal of tonsils has been necessary in only a small percentage of cases.

(3) With all our advancement and the different methods used in tonsil surgery, we yet lack an ideal operation. It remains for some one to devise an operation whereby tonsils may be removed without the formation of cicatricial tissue with its resultant contraction before we can claim a perfect tonsillectomy.

DISCUSSION (*Abstract*)

Dr. W. A. Wagner, New Orleans, La.—There are several indications for tonsillectomy in addition to those mentioned by the essayist. Parapharyngeal space infection, the direct result of tonsillitis; thyroidism associated with and due to diseased tonsils; malignancies originating in and confined to the tonsil; hyperkeratosis (mycosis) of the tonsil, which is not amenable to treatment; and cases of tonsillitic cranial pain associated with enlarged regional lymph nodes in the absence of sinusitis and dental caries which may account for the adenopathy: these indications are definite.

I wish to call to mind the recent investigations of T. J. Burgers and W. Wolffheim (Tonsil Problems, Klin. Wuchnochr., 10:1064, 1931), in which they conclude that the phagocytosis test in combination with or without other symptoms is extraordinarily valuable in the diagnosis of chronic tonsillitis. If the phagocytic number is under 50 (less than 50 per cent of the cells show phagocytosis) tonsillectomy is indicated because there is a deficiency of opsonins.

Should tonsillectomy be done for carriers of *Streptococcus epidemicus* as for carriers of diphtheria bacilli? It is my opinion that unless there is some other definite indication, it should not be done.

Not all of us are so fortunate in control of hemorrhage as to be forced to suture only one tonsil in seven years. It is my practice to suture all vessels which are not inclined to stop bleeding. This is done during the operation, although I use the Beck instrument in which the field is bloodless until the tonsil has been removed. A small, full curved round needle with very fine plain catgut (size 00) is used to suture the bleeding point which is previously clamped with a small pointed hemostat. The suture is superficial, to avoid sloughing from suturing too much tissue, as such sloughing predisposes to secondary hemorrhage.

The author describes an original method of engaging a tonsil by grasping it with a forcep upon which the assistant makes traction pulling toward the median line. While this is being done the tonsil is forced through the loop (fenestra) by making pressure on the anterior pillar in the usual manner. This traction makes it much easier to dislodge the tonsil from the fossa and renders dissection unnecessary. It is this method which I wish to stress as very important to the man who is accustomed to the Beck instrument. After the tonsil is engaged through the fenestra by pressure on the anterior pillar, the traction forcep held by the assistant is entirely released from the tonsil so that the posterior pillar may retract itself from the fenestra. Negligence in regard to this procedure is responsible for the faulty removal of a posterior pillar.

Under general anesthesia, the oral ether insufflation method is used to maintain the anesthetic after a gas induction of nitrous oxide or ethylene, and the head of the table is dropped until the table is tilted to an angle of about 25° to avoid pulmonary aspiration.

Dr. Murdock Equen, Atlanta, Ga.—Most patients, on being told that their tonsils have to be removed, bring up the question of possible hemorrhage. No doubt the widespread interest displayed by the laity in electric coagulation is due to the fact that this method obliterates the danger of postoperative hemorrhage. The method of removal plays an important part, as I have observed that some form of the Sluder method is less apt than the dissection method to result in a hemorrhage.

Only recently I removed by dissection small embedded tonsils from a woman aged 35 whose coagulation time was normal. Several sutures were necessary at the time of operation, but she left the table with a dry throat. Two hours later she began to bleed. She was returned to the operating room, but continued to bleed in spite of additional sutures. It appeared that she bled from even the needle punctures. A sponge was sewed in both tonsillar fossas and she was taken back to her room. She continued to bleed for about three hours and it was only when 10 c. c. of her own blood were injected into her buttock that the hemorrhage stopped. The obstetricians have injected maternal blood to control bleeding from the cord for some time, but this pa-

tient received her own blood. I envy Dr. Thompson his splendid postoperative results.

Dr. H. E. Christenbery, Knoxville, Tenn.—As after treatment has entered the discussion of this paper, I would like to give you a treatment that I have found effective and most satisfactory.

I use a solution of guiacol, one drachm in enough olive oil to make one ounce. Swab gently the field of operation from one to three times a day. This has a more or less anesthetic effect, keeps down much of the disagreeable odor and enables the patient to take a more or less regular meal, if the solution is used twenty to thirty minutes before meal time.

Having had it used on my own throat, I do not hesitate to submit it to you for use in your postoperative treatment of tonsillectomy.

Dr. Herman W. Frank, Gadsden, Ala.—I should like to ask the essayist whether he knows of any special refinements of technic which will prevent a too high postoperative agglutination of the lateral margins of the base of the tongue to the palatine pillars, usually the glossopalatine? I use the Beck-Schenck instrument as does the essayist, and do the so-called expanded operation. In my experience some of the cases which appear perfect at operation show in healing this undesirable excessive agglutination. It appears to be to a great extent beyond the control of the surgeon.

Dr. Thomas W. Moore, Huntington, W. Va.—We all endeavor to accomplish the same result in the removal of tonsils, namely: to take away all of the tonsil tissue and nothing but the tonsil, and have the minimum of scar tissue afterwards. We know that by saving the mucous membrane of the posterior pillars there is less contraction, because the fossa becomes better covered by epithelium. I do not think that it makes any difference what technic is employed if the above premises are observed. Let each man follow the method which enables him to do this.

I have very few primary hemorrhages, as I tie off all of the bleeding vessels at the time of the operation and send the patient to his room with a dry throat, but I have observed an increasing number of secondary hemorrhages, that is, hemorrhages coming on from the third to the tenth day after the operation. I have discussed this with several operators who have also observed this tendency. I am at a loss to explain it.

Dr. C. E. Dunaway, Miami, Fla.—I should like to ask the Doctor if, in his opinion, there are no objections to this method. My own experience has been that, in the use of the Beck instrument, results are often far from satisfactory because nearly always a small piece of tonsil is left at the lower pole which must be removed by a snare. Therefore, in my opinion, the dissection method is a superior operation.

Dr. H. J. Ault, Dalton, Ga.—In 1925 I saw a fifteen-year-old girl who had lost the vision of both eyes. She could not tell day from night. I could find no pathological condition in the eyes, except loss of sight, and she was normal in other respects except that she had very large and badly infected tonsils. Four weeks after their removal she began to see light. Her vision gradually returned and has remained normal ever since. One of my competitors said that the blindness was caused by hysteria. If this is true, tonsillectomy is another remedy for hysteria.

A case of cardiac insufficiency in a man forty years old showed a similar remarkable recovery two weeks after tonsillectomy.

Dr. Thompson (closing).—My experience with suturing at time of operation, as a safeguard against secondary hemorrhage, has shown that I am as likely to have a secondary hemorrhage following an operation where there is little primary bleeding as following one in which there is free bleeding. Some of my worst secondary bleeders have been so nearly bloodless at the time of operation that I feel sure no operator would have introduced a suture.

AN OUTLINE OF THE MATERNAL HYGIENE PROGRAM AND THE RESULTS OF SIX YEARS' WORK IN WILLIAMSON COUNTY, TENNESSEE*

By W. C. WILLIAMS, M.D.,†
Franklin, Tenn.,
and
E. L. BISHOP, M.D., C.P.H.‡
Nashville, Tenn.

While there may be some difference in the reporting or interpretation of the causes of maternal deaths in the various countries of the world, we are, nevertheless in the United States, confronted by the alarming fact that the maternal mortality rate of our nation has not shown any appreciable decline during the past decade. It is true that deaths from eclamptic conditions have shown an apparent downward trend but this is more than offset by the upward trend in deaths from sepsis, acknowledged as the greatest single cause of puerperal deaths. Each year there are more than two million mothers of the United States that reach the parturition period, and of that number more than fifteen thousand or approximately one out of every 150, do not survive the ordeal of childbirth. The actual invalidism resultant from childbirth is unknown but De Lee says,

"It is safe to say that fifty per cent of the women who have children bear the marks of injury and will, sooner or later, suffer from them."

Generally speaking, the medical supervision of rural expectant mothers in the past, and present as well, has consisted of a rather casual ex-

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†Director Williamson County Health Department.

‡Commissioner Tennessee State Department of Public Health.

amination at parturition unless the physician had to be consulted because of some complication prior to the onset of labor, and in most instances the physician is not even engaged until the onset of labor. The same applies to the urban expectant mother but to a much less degree. No doubt this lack of attention may in a large measure be explained by the statement that most complications of pregnancy and childbirth are considered by the lay individual as being more or less normally incident to the condition, and certainly pathological significance is attached only to those complications that have most often reached an alarming stage of development. An increasing scarcity of rural physicians and the distance to be traveled by patient to doctor are also factors that must be given definite consideration. These facts are mentioned for the sole purpose of emphasizing the enormity of the problem, the urgent need of adequate prenatal supervision and that proper care of pregnant women must be provided, if these maternal tragedies of everyday life are to be materially reduced and this unnecessary indictment against our civilization removed.

During the past six years efforts have been made in Williamson County, Tennessee, to overcome the traditional ideas regarding the complications of pregnancy, to encourage expectant mothers to place themselves under regular medical supervision early, and at the same time for the nursing service of the health department to act in a liaison capacity between physician and patient by supplying the physician with essential periodic information regarding the patient's general condition. Adequate information can be imparted only by personal contact in the home or by office visits. When a patient cannot go to see the physician or vice versa, it is obvious that home visiting by nurses is necessary if the unwarranted attitude of fatalistic resignation, often encountered, is to be effectively overcome and, in turn, medical care sought early in pregnancy.

Previous experience had shown that the organization and conduct of prenatal clinics in the area was rather unsatisfactory because of the relatively wide scattered population and the apparent aversion of rural expectant mothers to antenatal examination. It was felt in beginning this program that so far as the health department was concerned, the cases could best be handled as individuals by home nursing visits. Such a procedure, it was thought, would in time, bring the prospective mother to an appreciation of the potential dangers of pregnancy and to the realization that they are of rather serious aspect if ignored.

The program was first thoroughly outlined and discussed with the local medical society which made many valuable suggestions regarding routine procedure. Incidentally, unanimous endorsement was given the project before the field work was started on an intensive scale.

The general program, as originally agreed upon with the medical society, was quite similar to the program carried on by the Commonwealth Fund Child Health Demonstration in Rutherford County, Tennessee, during the years 1924-1928, inclusive, and the procedure has been essentially as follows from the beginning of our program on October 1, 1926.

(1) CASE FINDING

(a) Cases are reported by physicians when they feel that field nursing instructions are needed and would be received by the patient. The patient is advised by the doctor that the nurse will be requested to visit her home at an early date for the purpose of general instructions, to assist her to prepare for delivery, and to carry out such special orders as the physician feels indicated.

(b) Cases found by the nurse during routine field work or cases reported by persons other than the attending physician are visited by a nurse as soon as convenient and medical care is urged. Such first visits are largely of a get-acquainted nature, for the opening of the case record and securing of essential data, and in case the patient has not engaged a physician she is urged to do so without delay and the reasons for so doing are carefully explained.

(2) CASE VISITING

(a) *Prenatal Service.*—All prenatal cases are visited as soon as possible after being reported. Visits are made to cases once each month up to and including the seventh month of pregnancy and each two weeks thereafter, if possible, until delivery.

An attempt is made to impress upon the patient that instructions are given at the request of the family physician, or, if no physician has been engaged, that special care or instructions will not and cannot be given except under recognized medical direction. Where the husband can be reached he is also made aware of the fact that many of the tragic complications

of pregnancy and childbirth can be prevented by adequate medical supervision. This little procedure usually gets results.

Temperature, pulse, respiration, blood pressure, and urine specimen for chemical and microscopic examination are routinely taken on all persons at each visit whether or not a physician has been previously engaged. This is believed to be imperative because the patient's general condition should be known as early in pregnancy as possible. Moreover, when abnormal conditions are found the nurse has a very definite argument for urging immediate medical attention. In no instance does the nurse specify the particular condition found, but instead she advises the patient that an abnormal condition which needs medical care is present.

Inquiry is made regarding presence of such danger signals as excessive nausea, especially nausea and vomiting appearing or persisting after the third month, persistent headaches, fainting spells, dizziness, spots before the eyes, shortness of breath, edema, particularly of the face, excessive "heartburn", varicose veins, and leucorrhea or any other unusual discharge. The patient is instructed that the appearance of any of these symptoms is a definite indication of danger and for her own safety, as well as that of the unborn child, immediate communication with the family physician is imperative.

General instructions, based upon the attending physician's instructions, are given as to diet, elimination, rest, exercise, clothing and personal hygiene. The need for taking fluids, particularly milk, the general diet and rest are especially stressed.

Demonstrations and assistance in supply-making include the preparation of large paper pads to be used at the time of delivery and perineal pads for use during the puerperium. The layette and tray for the baby, and the utilization of available resources in the home for delivery are stressed. Instances of homely but practical suggestions are: perineal pads may be thoroughly sterilized by wrapping in brown paper and baking slowly in the ordinary cook stove using a small potato as an indicator—when the potato is well cooked the pads are sterile; a small size tin tray or even a shallow cake pan along with empty mayonnaise jars or other wide mouth jars may be used in preparing an inexpensive but excellent baby tray.

Special instructions which include the taking of an enema, sponge bath, having plenty of boiled water ready, are given and these preparations are to be made after labor begins and the physician has been called.

(b) *Postnatal Service.*—Postpartum nursing visits are made routinely upon the third and tenth days and about the fourth week in normal cases. When possible, visits are made, as requested by physicians, to the abnormal cases. The third day was selected for the first visit because lactation has usually begun at this time and if a breast binder is needed, its application can be demonstrated to the person taking care of the patient; any signs of infection, if they are to occur, will usually appear by this time. In case of perineal repair, stitches are inspected and care as indicated or requested by physician is given; temperature, pulse and respiration are always taken; a check is made to see that the baby is being put to the breast regularly and that boiled water is being given at intervals. The baby is always weighed on the first visit, the cord dressing is inspected and indicated care given along with other general postnatal observation and attention. All abnormal cases are visited more frequently if this is requested by the physician. Special instructions and care are given only upon the physician's orders.

(c) *Delivery Service.*—Nursing service is available for deliveries only in emergency cases and upon the specific request of physicians. Medical assistance is provided under similar circumstances. Hospitalization arrangements for emergency indigent or semi-indigent cases are frequently made through the health department at Vanderbilt University Hospital.

REPORTS TO PHYSICIANS

Written reports on all prenatal visits made are forwarded to the patient's physician. When any condition requiring immediate attention is found or is suspected, the nurse reports to the physician by 'phone immediately, either from the neighborhood or upon her return to the office. In no instance is the patient advised as to what the condition may be other than that an abnormal finding is present which requires medical attention. The written report includes the name and address of patient, estimated date of confinement, blood pressure at both the last and present visit, general condition of patient as observed, complaints if any, advice given and a complete urinalysis report. Reports are not made to midwives.

First and second visits to postpartum cases are reported to the physician by telephone on

the date the visit is made. This report includes general information regarding mother and child, together with such special information as the attending physician may have requested. Reports are not made to midwives.

MIDWIFE CONTROL

In Williamson, as in other counties, there is the problem of the midwife. Steps to regulate the practice of midwifery were first taken in 1925, when classes were organized and about sixty midwives were granted certificates of study upon completion of the instruction course. Of this number consisting almost entirely of negroes, about forty are still on the midwife register and attend quarterly meetings where the required equipment is inspected by the nurse and fresh silver nitrate ampules are distributed to replace those that are out of date. Additional names have been added to the midwife register until now there are about sixty-five who have been listed as occasionally attending a delivery.

The number of deliveries reported by midwives during the past calendar year averaged less than 1.5 births per midwife registered. Constant check is being made to see that all births are reported and investigation is made to see that a prophylactic is used in the eyes of the new-born. The birth reporting is easily checked, inasmuch as all certificates are routed through the health department office. The practice of midwifery is discouraged insofar as possible and although the actual number of births reported by midwives is little less than formerly, we know from checks made that the reporting is practically 100 per cent. Hence the actual deliveries attended by midwives are considerably less than formerly when reporting by midwives was low.

It was felt in beginning the program that a service increasing both in extent and intensity over a period of years should at least show whether or not a decreased death rate among supervised expectant mothers was within the realm of visible accomplishment. Certainly, some information should be gained by comparing the mortality rates of the supervised and non-supervised patients, and from this experience, some idea as to the adequacy and efficiency of our program could be gathered. *Table 1* shows for each year from 1927 to 1932, the total number of births reported in the county, the number of prenatal cases, with the proportion of total births under supervision of the county health department.

Table 1

NUMBER OF BIRTHS, NUMBER OF PRENATAL CASES AND PROPORTION OF TOTAL BIRTHS UNDER SUPERVISION ANNUALLY IN WILLIAMSON COUNTY, 1927-1932

Year Ending June 30	No. Births in County	Persons Under Supervision	
		Number	Per Cent of Births
1927	407	44	10.8
1928	462	51	11.0
1929	434	109	25.1
1930	515	217	42.1
1931	481	301	62.5
1932	448	332	74.1
Total	2747	1054	38.3

The above table shows that the proportion of expectant mothers in the county under supervision has gradually and consistently increased from 10.8 per cent in the year ending June 30, 1927, to 74.1 per cent during the fiscal year 1932.

It is of interest that the field nursing staff of the county health department has also increased from one nurse for the years 1927 and 1928 to two for the years 1929 and 1930 and in September, 1930, to four. Since the latter date the department has had one nurse for every 5700 people in the county.

It is of further interest that during the two-year period ending June 30, 1930, the average prenatal case was brought under supervision late in the eighth month of pregnancy; during the past two years the average time was early in the seventh month.

Prior to 1930, the average number of field visits per case was 4.2; during the past two years the average number per case was 5.3.

For purposes of appraising the results of the maternal hygiene program of the county, the total number of expectant mothers, as indicated by the total births reported, has been divided into two groups; the one, supervised by the county health department and the other, not supervised. The number of maternal deaths in each group has been tabulated by years, and the above data, with annual maternal mortality rates for each group are presented in *Table 2*.

Table 2

ANNUAL MATERNAL DEATH RATES IN WILLIAMSON COUNTY, TENNESSEE, 1927-1932, IN

(a) Persons under supervision of the County Health Department.
(b) Persons not under supervision of the County Health Department.

Year Ending June 30	(a) Persons Under Supervision			(b) Persons Not Under Supervision		
	Number	Maternal Deaths		Number	Maternal Deaths	
		Number	Rate per 1000		Number	Rate per 1000
1927	44	0	0.0	363	3	8.3
1928	51	0	0.0	411	3	7.3
1929	109	0	0.0	325	1	3.1
1930	217	0	0.0	298	1	3.3
1931	301	1	3.3	180	1	5.5
1932	332	0	0.0	116	1	8.6
Total	1054	1	0.9	1693	10	5.9

It will be observed from the above table that during the entire period, 1927-1932, of the 1054 persons under health department supervision, only one died, giving a maternity mortality rate of 0.9 per 1000, while the unsupervised group suffered rates varying from 3 to slightly less than 9 per 1000 with an average for the entire period of 5.9 or 6.6 times greater than that of the supervised group.

The above ratio does not necessarily represent the actual quantitative value of the service rendered by the health department since it is based upon a comparison of mortality rates from all causes. Perhaps a more exact measurement of the effects of the maternal hygiene program upon maternal mortality would be derived by comparing the two groups with respect to mortality rates from causes generally assumed to be influenced by the program previously outlined.

The eleven deaths occurring in the total group, supervised and non-supervised, and classified according to cause are as follows:

Cause of Death	Number of Deaths: Supervised Group	Non-supervised Group
(1) Eclampsia	0	3
(2) Septicemia	0	2
(3) Postpartum hemorrhage	0	2
(4) Cardiac disease	1	1
(5) Pulmonary embolism	0	1
(6) Bronchopneumonia	0	1

According to generally expressed views, the first condition enumerated above, eclampsia, and responsible for three deaths, may be assumed to be definitely preventable. The second and third conditions, septicemia and postpartum hemorrhage, responsible for four deaths, although perhaps not entirely preventable, may be considered to be distinctly influenced in their prevalence by adequate maternal hygiene care. The remaining three conditions, responsible for four deaths, are influenced to little, if any, extent by the ordinary maternal hygiene program.

Mortality rates from causes as classified above are shown for both the supervised and non-supervised groups in *Table 3*.

Table 3

MATERNAL MORTALITY RATES IN WILLIAMSON COUNTY, TENNESSEE, 1927-1932, FROM CAUSES CLASSED AS PREVENTABLE AND NON-PREVENTABLE IN PERSONS:

(a) Under County Health Department supervision.
(b) Not under County Health Department supervision.

Group	Preventable Causes		Non-preventable Causes	
	Number of Deaths	Rate per 1000 Births	Number of Deaths	Rate per 1000 Births
(a) Supervised	0	0	1	0.9 ±1.17
(b) Non-supervised	7	4.1 ±1.21	3	1.8 ±0.92

Thus it will be observed that from causes classed as preventable, no deaths occurred in the supervised group as compared to 7 or a rate of 4.1 per 1000 in the unsupervised. From causes considered non-preventable, the number of deaths in each group is too small to allow reliable comparisons. However, it is of interest that the non-supervised group suffered a rate from such causes similar to the supervised.

The one death occurring in the supervised white group was in a placenta previa case complicated by a chronic valvular heart disease. This case was visited on request of the physician and found to be in very poor physical condition because of cardiac disease, and irregular bleeding of a number of hours duration. The nurse notified the physician immediately and the baby was delivered alive by version within four hours from the time the case was first seen by the nurse. The patient expired suddenly about two hours after delivery. While not a case strictly under supervision, nevertheless, a record was opened and a debit must be entered against the supervised group. There were no deaths in the supervised colored group.

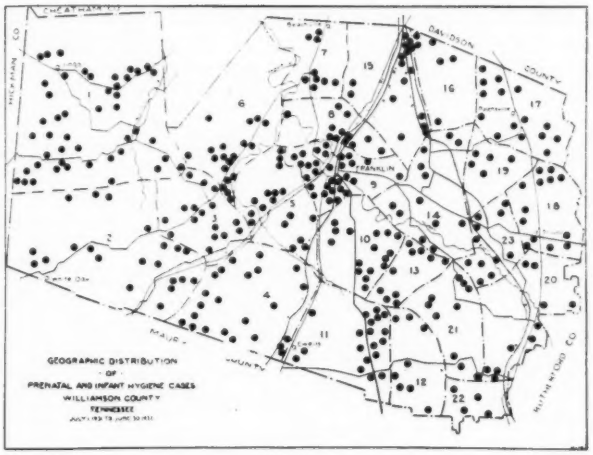

Chart 1

Due to small numbers, the groups shown in *Tables 2* and *3* were not classed according to color. However, there has been some color selection of supervised cases. Colored births in the county each year average about 21 per cent of the total, while during the entire period, less than 10 per cent of supervised cases were colored. During the past two years, 33 per cent of the total colored cases in the county were brought under supervision as compared with 78 per cent of the whites. During the six-year period, half of the deaths in the non-supervised group have been in the colored, but it is of particular interest that no death has occurred in the colored supervised group.

With the exception of color, no other selection which would be favorable to its mortality experience has been imposed upon the supervised group of persons; on the other hand, the service was rendered to that average or below-average group, for which medical supervision, except at the time of delivery, could not be readily provided, due to difficulties of finance and travel.

A study of the spot map (*Chart 1*) for the year ending June 30, 1932, which is typical of the distribution of other years, shows that the cases are more or less evenly distributed throughout the country, the only concentration appearing in the ninth district, in which the town of Franklin, the county seat, is situated, and this concentration is not out of proportion due to the relative concentration of population in this district.

Coincident with the increase in extent of prenatal and postnatal service is a reduction in total rates of maternal mortality. This is shown in *Table 4* and *Chart 2*.

Although the specific annual rates of mortality, as shown in *Table 4*, have rather large sampling errors, due to the small numbers involved, significance may be attached to them by reason of their more or less consistent decline.

Table 4

PROPORTION OF EXPECTANT MOTHERS UNDER SUPERVISION AND ANNUAL RATES OF MATERNAL MORTALITY IN WILLIAMSON COUNTY FOR EACH YEAR, 1927-1932

	Year Ending June 30					
	1927	1928	1929	1930	1931	1932
Per cent of cases under supervision	10.8	11.0	25.1	42.1	62.5	74.1
Maternal mortality rates per 1000	7.4	6.5	2.3	1.9	4.1	2.2

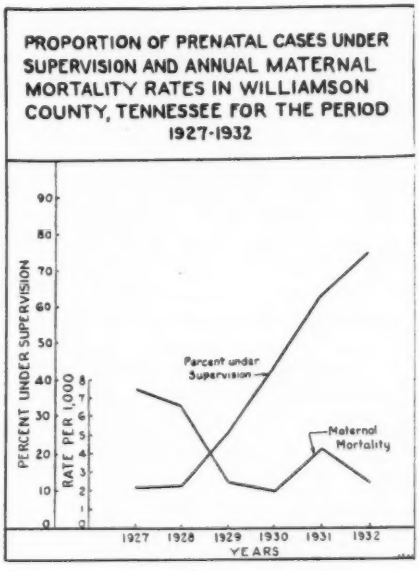

Chart 2

The experience in Williamson County suggests that when we began to approach adequate supervision of 50 per cent of our prenatal cases, a decline in the maternal mortality rates appeared, which seemed to be significant.

SUMMARY

(1) A rather intensive maternal hygiene program has been conducted in Williamson County, Tennessee, during the past six years without materially interfering with the other required and necessary health department activities.

(2) The number of supervised cases has steadily increased from year to year. A total of 74.1 per cent of all births reported in the area for the fiscal year ending June 30, 1932, and 38.3 per cent of all reported births in the six-year period had both prenatal and postnatal nursing care.

(3) The average time of admitting prenatal cases for the past two years was about the seventh month of pregnancy as compared to late in the eighth month for the preceding two years.

(4) The Health Department can render an invaluable service to this group of patients and at the same time not interfere in the least with the doctor-patient relationship.

(5) The success of the program seems to depend in a large measure upon the whole-hearted cooperation of the local medical profession and in this particular instance the physicians have expressed themselves as believing that the service has been of much benefit to them in their work, as cases are reporting themselves to their physicians earlier in pregnancy, thereby allowing a better service to be rendered the patient and some consideration to be given necessary financial arrangements before delivery.

(6) The number of deliveries by midwives has apparently declined during the period.

(7) The maternal mortality rate from all causes for the period 1927-1932 was 0.9 per 1000 in the supervised group and 5.9 in the unsupervised. From causes classed as preventable, no deaths occurred in the supervised group, while the unsupervised suffered a rate of 4.1 per 1000.

(8) The supervision of 50 per cent of prenatal cases in Williamson County has been associated with what we believe to be a significant decline in the maternal mortality rate.

THE BACTERIOLOGICAL STUDY OF URINARY INFECTION IN PREGNANCY AND PUERPERIUM WITH SPECIAL REFERENCE TO THE USE OF A URINARY ANTISEPTIC*

By T. K. BROWN, B.S., M.S., M.D.,
St. Louis, Mo.

In an attempt to standardize the therapy of urinary infections in pregnancy and the puerperium, a bacteriological study of the catheterized urine specimens obtained from patients with symptoms of urinary tract infections was made over the period from October, 1927, to June, 1931. Up to this time the treatment of such conditions on our service had been on an impirical basis, and the results had not been entirely satisfactory. It was hoped that the bacteriological findings might be of assistance in determining the type of therapy. The incidence of urinary tract infections had been sufficiently great to warrant such a bacteriological study.

The reports of Walther,[1] Tatum,[2] Deakin,[3] Wolbarst,[4] Pugh,[5] Mason[6] and others dealt with cases of urinary infections which were not associated with pregnancy.

Crabtree and Prather[7] have pointed out the importance of the establishment of a urological consultant service in relation to a lying-in hospital and have outlined the routine treatment of their cases. Our severe cases have been seen in consultation by Dr. D. K. Rose, of the Department of Urology of Washington University School of Medicine. Johnston[8] states:

"On the pathological side it is to be remembered that infection may spread to the urinary tract by the blood stream, by the lymphatics, and the direct spread generally associated with stasis of flow, along the urinary passages themselves. . . . . Prostatic hypertrophy in men and pregnancy in women are outstanding examples of lesions which initiate chronic infection of the urine, and in many cases of chronic cystitis there is some degree of atony of the bladder. In acute pyelitis or cystitis, where the commoner antiseptics are usually contraindicated, it is an established clinical fact that the combination of bland diluent drinks with alkaline diuretics results in a flushing out of the urinary tract and amelioration of symptoms, together with a lessened degree of infection."

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*From the Department of Obstetrics and Gynecology, Washington University School of Medicine, and the St. Louis Maternity Hospital.

*The pyridium for this study was furnished through the courtesy of Merck & Co., Inc.

This was the substance of our former treatment.

Hinman[9] reported that the colon bacillus is found in from 70 to 80 per cent of renal infections and that *Staphylococcus pyogenes albus* is the next commonest invader, being present in about 10 per cent of the cases. Young, Colston and Hill[10] report:

"A summary of observations in a series of 600 cases of bladder infections shows that 351 cases, 58.7 per cent of the series, were infected with colon group organisms, 253 of which were obtained in pure culture."

These findings are comparable to our series of 169 cases with positive cultures, in which the colon group of organisms was present in 62 per cent of the series and in pure culture in 43 per cent.

Davis and White[11] and Leonard[12] have enumerated the requirements of an ideal urinary antiseptic. In seeking for such an ideal urinary antiseptic, the properties of phenylazo-alpha-diaminopyridine monohydrochloride (pyridium) seemed to warrant an investigation. Goerner and Haly[13 14] have established, *in vitro*, the bactericidal and bacteriostatic power of pyridium. It is known that especially the dye substances vary in their reaction to bacteria according to whether the organism is gram-positive or gram-negative, and that there probably is some action as a result of the administration of these dyes which is not due to the direct action of the dye substances on the organism. Further studies in colloidal chemistry may some day explain this phenomenon.

The method in which our cases were studied was as follows: first we obtain a catheterized specimen of urine for culture in cases which presented urinary symptoms. The patient was prepared according to our routine for catheterization and a specimen of urine was collected in a sterile 15 c. c. centrifuge tube, which was sent to the laboratory at once for examination and culture. The specimen was centrifuged for five minutes at 1,500 to 2,000 revolutions per minute and the supernatant urine decanted. The sediment was then cultured both aerobically and anaerobically on blood agar media. This media contained 15 per cent human blood plasma and 2.5 per cent hemoglobin. The anaerobic cultures were planted by the Wright method. A smear of the sediment was made at once and examined to determine the presence of cocci or bacilli, or both.

In the early part of this series, the patients were put on pyridium regardless of bacteriological findings. The following table shows the results of our investigation:

ANALYSIS OF CASES

	Preg.	P. P.	Total
Cases on pyridium	11	61	72
Cases on other antiseptics	20	77	97
Cases with negative cultures	6	49	55
Number of cases cultured			224

	Cultures				
	B. Coli	Cocci	Gram Pos. Both	Gram Pos. Bacilli	Neg.
Group treated with pyridium	8	32	26	1	5
Group treated with other antiseptics	66	22	5	4	

I have pointed out the high incidence of the colon group of organisms in pyelitis of pregnancy and the puerperium, which is in agreement with the findings of other investigators in urinary infections in general. In the treatment of coccal infections, we used pyridium tablets in the recommended dosage of 2 tablets first, repeated in two hours, followed by 2 tablets three times a day for 36 to 48 hours, when the dosage was reduced to 1 tablet three times a day after meals. In this group of cases the results were very satisfactory, with the alleviation of symptoms usually within 48 hours, and the disappearance of cocci from the urine in the majority of cases in approximately a week. In one case the cultures of the urine from the bladder continued to grow a *Staphylococcus albus*, although the patient was symptom-free, until the bladder was instilled with pyridium solution. The high concentration of the dye in the bladder then was effective in eliminating the organism.

In the group of 72 cases treated with pyridium, 13, or 18 per cent, were not entirely satisfactory in that the cultures remained positive, although, clinically, the patient was definitely improved. In each of these cases there were present both cocci and members of the colon group of organisms. *Cases 4895* and *8389* are examples of this type. Following the treatment with pyridium the cocci disappeared as in the rest of the series, but the colon organisms were still present in considerable number. In a few of these cases pyridium was discontinued with the result that there was an exacerbation of the urinary infection due to the continued presence of the coliform organisms. It is, therefore, obvious that additional therapy is necessary when these organisms are present. We now administer hexamethylenamine and acid sodium phosphate in conjunction with pyridium in mixed infections. With the disappearance of cocci from the urinary tract, py-

Table 1

CASES TREATED WITH PYRIDIUM

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
522	42	Preg.	None	Pyelitis Cystitis	Staph. albus	None	Pyridium	2 days	2	Negative	Good	No
722	19	P. P.	None	Pyelitis	Staph. albus, B. coli	None	Pyridium	6 days	1	Negative	Good	No
738	26	P. P.	None	Pyelitis	Staph. albus	None	Pyridium	9 days	1	Negative	Good	No
986	18	P. P.	None	Pyelitis Cystitis	Staph.	G. C. salpingitis	Pyridium	9 days	2	Negative	Good	No
1068	21	P. P.	None	Pyelitis	Staph. albus	None	Pyridium	3 days	1	Negative	Good	No
1180	19	P. P.	None	Pyelitis	B. coli	None	Pyridium	8 days	1	Negative	Good	No
1281	21	P. P.	None	Pyelitis	Staph. albus	None	Pyridium	2 days	1	Negative	Good	No
1231	21	P. P.	None	Cystitis	Staph. albus	Thrombophlebitis	Pyridium	6 days	1	Negative	Good	No
1362	18	P. P.	None	Pyelitis	Staph. albus	None	Pyridium	11 days	1	Negative	Good	No
1088	22	P. P.	None	Pyelitis(?)	Negative culture	None	Pyridium	3 days	1	Negative	Good	No
1302	31	Preg.	None	Ureteral colic	Negative culture	None	Pyridium	5 days	1	Negative	Good	No
1332	19	P. P.	None	Pyelitis(?)	Negative culture	None	Pyridium	10 days	1	Negative	Good	No
4706	25	Preg.	None	Pyelo-nephritis	B. coli, gram-positive cocci	None	Pyridium	17 days	3	Improved	Good	No
1409	28	Preg.	None	Pyelitis	B. coli	Nose and throat infection	Pyridium	9 days	1	Negative	Good	No
1685	17	P. P.	Pyelitis 4 to 5 mos.	Pyelitis	B. coli	Hydronephrosis	Pyridium	28 days	1	Positive	Poor	Yes
2340	28	P. P.	None	Pyelitis	Anaerobic strep.	None	Pyridium	3 days	1	Negative	Good	No
2435	29	P. P.	None	Pyelitis(?)	Non-hemolytic aerobic strep.	None	Pyridium	4 days	2	Negative	Good	No
2284	28	P. P.	None	Pyelitis	Staph. albus, anaerobic strep., B. coli	Appendicitis and thrombophlebitis	Pyridium	6 days	2	Few strep.	Good	Yes
3162	30	P. P.	None	Pyelitis	B. coli, Staph. albus and anaerobic strep.	None	Pyridium	5 days	2	B. coli still present	Good	No
3436	43	P. P.	None	Puerperal infection	Negative culture	Pelvic abscess	Pyridium	7 days	2	Negative	Good	No
3231	24	P. P.	None	Pyelitis	Anaerobic strep.	None	Pyridium	3 days	1	Negative	Good	No

Table 1 (Continued)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
3796	37	P. P.	None	Pyelitis	Staph. albus	None	Pyridium	6 days	2	Improved	Good	No
3988	19	P. P.	None	Pyelitis	Staph. albus	None	Pyridium	4 days	2	Negative	Good	No
4118	36	P. P.	None	Pyelitis	Anaerobic strep. Staph. albus	Lung abscess	Pyridium	10 days	2	Improved	Good	No
4401	34	P. P.	None	Pyelitis	Staph. albus	Puerperal infection	Pyridium	13 days	1	Negative	Good	No
4327	31	P. P.	None	Pyelitis	B. coli, anaerobic strep.	Wound infection	Pyridium	24 days	3	Negative	Good	No
4466	18	P. P.	None	Pyelitis	B. coli, gram-positive strep.	None	Pyridium	5 days	4	Negative	Good	No
4737	20	P. P.	None	Pyelitis	Staph. albus, anaerobic strep.	Septicemia Mastitis	Pyridium	11 days	3	Improved	Good	Yes
4792	20	P. P.	None	Pyelitis	B. coli, Staph. albus, gram-pos. bac., anaer. strep.	Puerperal infection	Pyridium	14 days	3	Negative	Good	Yes
1183	18	P. P.	Pyelitis 1 year	Pyelitis	Staph. albus, anaerobic bacilli	None	Pyridium	9 days	2	Improved	Good	Yes
4960	23	P. P.	None	Pyelitis	B. coli	Anemia	Pyridium	2 days	2	Improved	Fair	No
5139	30	P. P.	None	Puerperal infection	Negative culture	Pelvic abscess	Pyridium	14 days	2	Negative	Died	No
5159	18	P. P.	None	Pyelitis	Cocci in smear	Anemia	Pyridium	6 days	1	Negative	Good	No
5250	18	P. P.	Cystitis(?)	Cystitis	Gram-pos. bacilli	Gonorrhea(?)	Pyridium	8 days	1	Improved	Fair	No
5298	20	P. P.	None	Cystitis	Staph. albus	Appendicitis and peritonitis	Pyridium	1 day	1	——	Died	No
4895	38	P. P.	None	Pyelitis	B. coli, anaerobic strep.	Puerperal infection	Pyridium	46 days	11	Improved. B. coli still pres.	Good	No
5418	16	P. P.	None	Cystitis	Staph. albus, gram-pos. bacilli, anaerobic strep.	Pyonephrosis	Pyridium	35 days	8	Positive	Improved	Yes
5611	24	P. P.	None	Cystitis	Staph. albus	None	Pyridium	6 days	1	Negative	Good	No
5747	24	P. P.	None	Cystitis	B. coli	Cesarean section	Pyridium	2 days, then alkalis used	1	Negative	Good	No
6310	16	P. P.	None	Pyelitis	B. coli, gram-neg. coccus	Miscarriage	Pyridium	6 days	3	B. coli still present	Good	No
6392	20	P. P.	None	Cystitis	Staph. albus	None	Pyridium	9 days	2	Negative	Good	No

Table 1 (Continued)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
6537	16	P. P.	None	Cystitis	Gram-neg. coccus	None	Pyridium	4 days	2	Negative	Good	No
7140	20	P. P.	Yes	Pyelitis Cystitis	Gram-pos. and -neg. cocci, B. coli	None	Pyridium	8 days	3	B. coli still present	Good	No
7490	20	P. P.	None	Cystitis	Staph. albus	Retention of urine	Pyridium	13 days	2	Very few Staph. present	Good	No
7679	19	P. P.	None	Cystitis	Staph. albus	None	Pyridium	7 days	2	Negative	Good	No
7705	27	P. P.	None	Pyelo-nephritis	Staph. albus, B. coli communis	Pneumonia, septicemia, lung abscess	Pyridium	2 days	5	Negative	Improved	Yes
7993	15	P. P.	None	Cystitis	B. coli and gram-pos. cocci	None	Pyridium	9 days	3	Negative	Fair	No
8027	18	P. P.	None	Cystitis	Non-hemolytic strep.	None	Pyridium	3 days	4	Negative	Good	No
8247	26	P. P.	None	Cystitis	Staph. albus, B. coli	Manual removal of placenta	Pyridium	6 days	3	B. coli still present	Good	No
8262	21	P. P.	None	Cystitis	Staph. albus	None	Pyridium	8 days	4	Some cocci still present	Good	No
8512	22	P. P.	None	Cystitis	Staph. albus	None	Pyridium	2 days	1	Negative	Good	No
8879	25	P. P.	None	Pyelitis	Non-hemolytic strep., gram-neg. bacillus	Breast abscess	Pyridium	2 days	1	Negative	Improved	No
9153	20	P. P.	None	Cystitis Pyelitis	B. coli	Pyelonephritis	Pyridium	5 days	2	?	Fair	Yes
9463	17	P. P.	None	Cystitis	B. coli, staph.	Endometritis	Pyridium	5 days	2	Negative	Good	No
7960	28	P. P.	None	Cystitis	Staph. albus	Breech	Pyridium	3 days	2	Negative	Good	No
7415	37	P. P.	None	Pyelitis	B. coli	None	Pyridium Hexa. $NaHCO_3$	7 days 1 day 2 days	1	Positive	Improved	No
9589	39	P. P.	None	Pyelo-nephritis	B. coli, gram-pos. strep.	None	Pyridium Alk. and hexa.	2 days ? days	2	Gram-neg. bacilli present	Died	Yes
4466	19	P. P.	None	Pyelo-nephritis	B. coli, strep.	None	Pyridium $NaHCO_3$	5 days 10 days*	4	B. coli Staph. albus	Improved	Yes
6381	38	P. P.	None	Pyelitis	Strep. non-hemolytic, B. coli	Retention of urine	Hexa. Pyridium $NaHCO_3$	7 days 7 days **	2	B. coli	Improved	No

*Cocci diminished, then reappeared. **Eight days before pyridium started and 2 days after.

Table 1 (Concluded)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
8389	24	P. P.	None	Cystitis	B. coli, strep. intermittently	Vesico-vaginal fistula, pyelitis	Hexa. $NaHCO_3$ Pyridium*	61 days 13 days 36 days	10	B. coli	Improved	Yes
10749	22	P. P.	None	Pyelitis Cystitis	Gram-neg. bacillus (B. coli)	Hypertension	$NaHCO_3$ Pyridium Hexa.	3 days 10 days 6 days	2	Organisms still present	Improved	No
10643	28	P. P.	None	Cystitis	Cocci	Hysterectomy	Pyridium	3 days	None	Negative	Cured	No
10703	18	Preg.	None	Pyelitis	Staph. albus	Vomiting of pregnancy	Pyridium	7 days	4	Negative	Cured	No
6205	23	P. P.	None	Cystitis	Staph. albus	Long labor	Pyridium	15 days	3	?	Improved	No
10427	28	P. P.	None	Cystitis	Staph. albus	Placenta previa Endometritis	Pyridium	5 days**	2	Positive	Improved	No
10049	33	P. operative	None	Cystitis Pyelitis	B. coli, anaerobic strep.	Porro section	Pyridium Hexa. W. blad. mix.	10 days 6 days 6 days†	4	B. coli still present; cocci gone	Improved	No
10857	22	Preg. and P. P.	None	Pyelitis	B. coli, gram-neg. cocci		Pyridium Hexa. $NaHCO_3$	7 days 5 days 6 days	4	B. coli	Well	No
11048	28	P. P.	None	Pyelitis	Aerobic strep. and B. coli	Endometritis	Pyridium $NaHCO_3$	6 days At discharge	3	B. coli	Improved	No
11039	18	P. P.	None	Pyelitis	Gram-pos. diplococcus, B. coli	Endometritis	Pyridium Hexa.	8 days 4 days‡	3	B. coli	Fair	No
11272	21	P. P.	None	Pyelitis	Staph. albus	Urine infection followed operation	Pyridium	4 days	2	Negative	Good	No
11040	25	P. P.	Cystitis 2 mos. prev. B. coli	Cystitis	Gram-pos. cocci	Placenta previa and pneumonia	Pyridium Hexa.	5 days 4 days	1 (B. coli present)	Negative	Good	No
11135	37	P. P.	None	Cystitis	Gram-pos. strep., B. coli	Cesarean section with hysterectomy	Pyridium Hexa. $NaHCO_3$	4 days 10 days 4 days	3	Negative	Good	No

*123 hospital days. Cocci disappeared each time pyridium was used and coli persisted throughout.
†Discharged on $NaHCO_3$.
**Sent home on pyridium.
‡$NaHCO_3$ at discharge.

Table 2

CASES TREATED WITH OTHER DRUGS

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
158	33	P. P.	None	Pyelitis	B. coli, Staph. albus	None	$NaHCO_3$ Hexa.*	13 days	1	Negative	Good	Yes
102	21	P. P.	None	Pyelitis	B. coli	Ptosis of kidney	Hexa., $NaHCO_3$ Hexylresorcinol	22 days	3	Improved	Good	Yes
418	22	Preg.	None	Pyelitis	B. coli	None	Hexa.	6 days	1	Improved	Good	No
911	26	Preg.	Pyelitis	Pyelitis	B. coli	None	$NaHCO_3$ Hexa.	29 days	3	Positive	Good	Yes
1015	17	Preg.	Pyelitis	Pyelitis	B. coli	Ptosis of r. kidney	$NaHCO_3$ Hexa.	9 days	1	Improved	Good	Yes
897	23	P. P.	None	Nephritis	B. coli	None	$NaHCO_3$ Hexa.	17 days	2	Positive	Fair	Yes
1257	27	P. P.	None	Pyelitis	B. coli	Retention of urine	------	---	1	Positive	Fair	Yes
1672	21	P. P.	None	Pyelitis	B. coli	None	$NaHCO_3$ Hexa.	12 days	1	Improved		No
2434	26	Preg.	None	Pyelitis	B. coli	None	$NaHCO_3$ Hexa.	21 days	1	Improved	Good	Yes
2786	20	P. P.	None	Pyelitis	B. coli	None	Hexa.	9 days	1	Improved	Good	No
2930	31	P. P.	None	Pyelitis	Staph. albus	None	Hexa.	4 days	1	Improved	Good	No
3041	29	Preg.	None	Cystitis	B. coli	None	$NaHCO_3$ Hexa.	24 days	2	Improved	Good	No
3097	30	P. P.	None	Cystitis	Staph. albus	Endometritis	Hexa.	2 days	1	Improved	Good	No
3399	44	P. P.	None	Pyelitis	B. coli	Hydronephrosis	Hexa.	17 days	3	Positive		Yes
1850	32	P. P.	None	Pyelitis	B. coli	Pulmonary Tb.	$NaHCO_3$ Hexa.	19 days	3	Improved		Yes
3696	33	P. P.	None	Cystitis	B. coli	None	None	------	1	Positive	Good	Yes
4211	21	P. P.	None	Pyelitis	B. coli	None	$NaHCO_3$ Hexa.	8 days	1	Improved	Good	No
4260	28	P. P.	None	Pyelitis	B. coli	None	M220 in bladder	8 days	1	Improved	Fair	No
4274	41	P. P.	None	Cystitis	Gram-pos. bac.	Phlegmasia Albadolens	$NaHCO_3$ Hexa.	3 days	1	Negative	Good	No

*Hexamethylenamine.

Table 2 (Continued)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
4386	24	P. P.	None	Pyelitis	Staph. albus	None	$NaHCO_3$	7 days	1	Positive	Good	No
4467	35	P. P.	None	Cystitis(?)	B. coli	None	$NaHCO_3$	7 days	1	Positive	Good	No
4501	27	P. P.	None	Cystitis	Staph. albus	Retroversion	Borated glycerin	4 days	1	Improved	Good	No
4637	17	P. P.	None	Pyelitis	B. coli	None	$NaHCO_3$ Hexa.	7 days	2	Positive		Yes
4668	18	P. P.	None	Pyelitis	Staph. albus	None	$NaHCO_3$	6 days	3	Gram-pos. bac.	Improved	No
4927	20	Preg.	None	Pyelitis	B. coli	Pulmonary Tb.		16 days	2	Improved	Fair	Yes
5486	22	P. P.	None	Pyelitis(?)	B. coli	Retained secundines	Hexa.	5 days	1	Improved		No
8102	32	Preg.	None	Cystitis	B. coli	None	$NaHCO_3$ Hexa.	2 days 8 days	2	Improved	Improved	No
8131	22	P. P.	None	Cystitis	Staph. albus	None	None	—	2	Few pus cells	Improved	No
8250	17	P. P.	None	Cystitis	B. coli	None	Hexa.	5 days	2	Negative	Improved	No
8271	36	Ectopic preg.	None	Cystitis	B. coli	None	$NaHCO_3$ Hexa.	9 days 8 days	1	?	Good	No
8290	31	P. P.	None	Cystitis	B. coli	None	Hexa.	9 days	1	Positive	Improved	No
8307	22	P. P.	None	Cystitis	B. coli	Hydronephrosis Pyelonephritis	$NaHCO_3$ Hexa.	5 days 16 days	4	?	Improved	Yes
8657	19	P. P.	None	Cystitis(?)	Contamination(?) Anaerobic strep.	Endometritis	None	—	1	?	Improved	No
8898	28	P. P.	None	Cystitis(?)	Staph. albus	None	None	—	1	?	Improved	No
9137	27	P. P.	None	Cystitis	B. coli	None	Hexa.	9 days	2	Positive	Improved	No
8897	19	Preg.	None	Cystitis	B. coli	None	$NaHCO_3$ Hexa.	4 days 9 days	2	Positive	Improved	No
9378	21	Ectopic preg.	None	Cystitis(?)	B. coli	None	$NaHCO_3$ Hexa.	3 days 7 days	2	Positive	Improved	No
5263	34	Preg.	None	Pyelitis	B. coli	None	Hexa.	5 days	2	Positive	Improved	No
6727	38	Preg.	None	Cystitis	B. coli	None	Hexa.	2 days	1	Positive	Improved	No
6331	23	P. P.	Yes	Pyelitis	B. coli	Retention of urine	$NaHCO_3$	12 days	2	Positive	Improved	No
4972	23	P. P.	None	Cystitis(?)	Staph.	None	Hexa.	2 days	1	Negative	Improved	No
2215	18	P. P.	None	Cystitis(?)	Gram-pos. coccus	None	$NaHCO_3$	3 days	1	?	Improved	No
1280	28	P. P.	None	Cystitis(?)	Staph.	Cesarean section	None	—	1	Improved	Improved	No

Table 2 (Continued)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
8154	24	P. P.	None	Cystitis	B. coli	Retention of urine	Hexa.	5 days	1	Positive	Improved	No
1823	23	P. P.	Pyelitis	Pyelitis	Gram-pos. bac.	None	$NaHCO_3$	4 days	1	Negative	Improved	No
6036	18	P. P.	None	Cystitis	B. coli	None	$NaHCO_3$	5 days	1	Improved	Improved	No
9707	30	P. P.	None	Pyelitis	B. coli	None	Hexa.	7 days	3	Negative	Improved	No
7765	44	Hydatid mole	None	Cystitis(?)	Staph. albus(?)	None		------	3	Negative	Improved	No
9135	23	P. P.	Yes	Cystitis	Staph. albus	None		------	2	Positive	Improved	No
8785	31	P. P.	None	Cystitis	B. coli	None	Hexa.	11 days	2	Positive	Improved	No
5915	30	P. P.	None	Cystitis	Staph. albus	Peritonitis Endometritis	None	------	1	Positive	Died	No
5927	18	P. P.	None	Cystitis(?)	Staph.	None	None	------	1	?	Fever still present	No
6011	22	P. P.	None	Cystitis(?)	Gram-pos. cocci	None	$NaHCO_3$	9 days	1	Pus still present	Improved	No
6096	26	P. P. (section)	None	Cystitis	B. coli	None	Hexa.	5 days	1	Pus still present	Improved	No
6141	24	P. P.	None	Cystitis(?)	Staph. albus	Endometritis	Hexa. $NaHCO_3$	6 days 2 days	1	?	Improved	No
6157	21	P. P.	None	Cystitis(?)	B. coli	Cesarean section	None		1	Positive	Improved	No
6281	35	P. P.	None	Pyelitis	B. coli Anaerobic strep.	Endometritis Septicemia	Hexa.	16 days	1	Negative	Good	No
6338	19	Preg.	None	Pyelonephritis	B. coli	None	$NaHCO_3$ Hexa.	4 days 12 days	2	Positive	Improved	Yes
6503	21	P. P.	None	Cystitis	B. coli	None	$NaHCO_3$ Hexa.	12 days 5 days	2	Negative	Well	No
6734	19	P. P.	None	Cystitis	B. coli	Endometritis	None		1	Bacilli present	Improved	No
6790	22	P. P.	None	Cystitis	Anaerobic strep.	None	$NaHCO_3$	4 days	1	?	Improved	No
6886	25	P. P.	None	Cystitis	Staph. albus	Endometritis	W. bladder mixture	5 days	1	Positive	Improved	No
7412	25	Preg.	None	Pyelitis	B. coli	None	Hexa.	12 days	1	Positive	Improved	No
7516	22	P. P.	None	Cystitis	B. coli, B. subtilis	Endometritis	Hexa. W. bladder mixture	7 days 2 days	2	Improved	Improved	No
7724	23	Preg.	None	Pyelitis	B. coli	Hydronephrosis, r.	Hexa.	2 days	2	?	Improved	Yes

Table 2 (Continued)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
7732	23	P. P.	None	Pyelitis	B. coli	Endometritis	Hexa. W. bladder mixture	8 days 5 days	2	Negative	Improved	No
7774	28	P. P.	None	Pyelitis	B. coli	Pneumonia	$NaHCO_3$ Hexa.	4 days 4 days	2	Improved	Improved	No
7822	23	P. P.	None	Cystitis	Gram-pos. bacillus	None	$NaHCO_3$ Hexa.	3 days 3 days	1	Negative	Improved	No
8017	37	Preg.	None	Pyelitis	B. coli	Rhinitis	$NaHCO_3$ Hexa.	1 day 19 days	4	Improved	Improved	Yes
8047	39	P. P.	None	Pyelitis	B. coli	Cellulitis	$NaHCO_3$ Hexa.	5 days 9 days	4	Negative	Improved	No
9720	42	P. P.	None	Pyelitis	B. coli	None	Hexa.	13 days	3	Negative	Good	No
9750	16	P. P.	None	Pyelitis	Non-hemolytic strep.	None	$NaHCO_3$ Hexa.	4 days 3 days	1	Negative	Good	No
9800	18	P. P.	None	Cystitis	B. coli, non-hemolytic strep.	Retention of urine	M220 instillations	4 days	2	?	Good	No
9807	30	P. P.	None	Cystitis	B. coli	None	Hexa.	9 days	2	B. coli at discharge	Good	No
6559	25	P. P.	None	Cystitis	B. coli, staph.	Cesarean section	$NaHCO_3$	14 days	1	Improved	Good	No
8113	27	P. P.	None	Cystitis	B. coli	Abscess of vagina	Hexa. $NaHCO_3$	11 days 1 day	1	Negative	Good	No
3696	33	P. P.	None	Cystitis	B. coli	Cesarean section retention catheter	Bladder irrigations		1	Improved	Good	Yes
6328	25	P. P.	None	Cystitis	B. coli	Casarean section retention catheter	$NaHCO_3$ Hexa.	3 days 10 days	1	Bacilli present	Good	No
8194	19	Preg.	None	Appendicitis	Strep. in second culture	None	None		2	?	Good	No
9576	20	P. P.	None	Cystitis	B. coli	Cesarean section retention catheter	Hexa. $NaHCO_3$	6 days 3 days	1	?	Good	No
9856	18	P. P.	None	Cystitis	Gram-pos. bacillus	Miscarriage	Hexa.	5 days	2	Negative	Good	No
10622	18	P. P.	None	Cystitis	B. coli	Cesarean	$NaHCO_3$ NH^4Cl	3 days 7 days	1	Negative	Good	No
10893	24	P. P.	None	Cystitis	Staph. albus	Mastitis	Citro. carbonate	3 days	1	?	Good	No
10848	23	P. P.	None	Pyelitis	B. coli		$NaHCO_3$ Hexa.	1 day 4 days	1	?	Improved	No

Table 2 (Concluded)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis of Present Infection	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
10706	28	P. P.	None	Cystitis	B. coli	Pansinusitis Residual urine	$NaHCO_3$ Hexa.	3 days 5 days	1	?	Improved	No
10102	28	P. P.	None	Cystitis	B. coli	Very difficult delivery. Contracted pelvis	Hexa. $NaHCO_3$	8 days 7 days	1	Organisms still present	Improved	No
10382	20	P. P.	None	Pyelonephritis, bilateral	B. coli	Long labor Retention of urine	$NaHCO_3$	13 days	3	Improved	Improved	Yes
10373	30	P. P.	None	Cystitis	B. coli	Endometritis	Hexa.**	6 days	1	?	Improved	No
10428	30	Preg.	Yes, with prev. preg.	Pyelitis	B. coli		$NaHCO_3$	5 days	2	Positive	Improved	No
10732	21	P. P.	None	Cystitis	B. coli		Sodium lactate	5 days	2	B. coli	Improved	No
10827	29	P. P.	None	Pyelitis	B. coli	Hydronephrosis Cystitis	$NaHCO_3$ Hexa.	10 days 2 days	1	Positive	Improved	No
11123	30	P. P.	None	Cystitis	B. coli	Post abortion	$NaHCO_3$	4 days	1	B. coli	Improved	No
11404	26	P. P.	None	Cystitis	B. coli		$NaHCO_3$	7 days	1	B. coli	Improved	No
11642	36	P. P.	None	Cystitis	B. coli		None		1	No final smear	Improved	No
11213	28	Preg.	None	Retention of urine	Gram-pos. & gram-neg. bac.		None		1	Negative	Improved	No
11625	32	P. P.	None	Retention of urine	B. coli, few gram-pos. cocci		$NaHCO_3$	5 days	1	Negative	Good	No
11425	26	P. P.	Cystitis during pregnancy	Cystitis	B. coli		Hexa. Citro. carb.	4 days 5 days	1	No final smear	Good	No

**Discharged on $NaHCO_3$.

*Footnote.—When hexamethylenamine was used, acid sodium phosphate was always given in conjunction with it.

Table 3

CASES WITH NEGATIVE CULTURES

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
4078	28	P. P.	None	Acute nephritis	Negative	.....	.....	.....	1	Improved	Improved	No
8202	35	P. P.	None	Toxemia of pregnancy	Negative	.....	.....	.....	1	Negative	Improved	No
9658	27	Preg.	None	.....	Negative	Chronic myocarditis	.....	.....	1	Negative	Fair	No
9961	31	Preg.	None	.....	Negative	Vomiting of pregnancy	.....	.....	1	Negative	Improved	.....
9908	21	P. P.	None	.....	Negative	Incipient Tb.(?)	Pyridium	4 days	2	Negative	Good	.....
4129	23	P. operative	None	.....	Negative	Ruptured uterus	.....	.....	1	.....	Died Septicemia	.....
10227	27	P. P.	None	.....	Negative	Pre-eclamptic	.....	.....	1	.....	Improved	.....
3304	33	P. P.	None	.....	Negative	Chr. Pul. Tb.	.....	.....	1	.....	Improved	.....
10087	28	Post abortal(?)	None	.....	Negative	.....	.....	.....	1	.....	Improved	.....
11105	27	P. operative	None	.....	Negative	Ectopic pregnancy	.....	.....	1	.....	Improved	.....
11163	22	P. P.	None	.....	Negative	Endometritis	.....	.....	1	.....	Good	.....
11175	23	P. P.	None	.....	Negative	Fever on 12th day P. P.	$NaHCO_3$ on disch'ge	.....	1	.....	Well	.....
11210	23	P. P.	None	.....	Negative	Mastitis	$NaHCO_3$	9 days	2	.....	Good	.....
11302	23	P. P.	None	.....	Negative	Laryngitis	$NaHCO_3$	4 days	1	.....	Good	.....
11661	24	P. P.	None	.....	Negative	Retention of urine	Hexa. $NaHCO_3$ Hexa.	2 days 4 days 5 days	1	.....	Good	.....
11475	18	Post abortal	None	.....	Negative	Endometritis; abortion incomplete	.....	.....	1	.....	Good	.....
8474	20	P. P.	None	.....	Negative	Mastitis	.....	.....	1	.....	Good	.....
8412	22	P. P.	None	.....	Negative	*See footnote.	Pyridium (Prophylactic)	20 days	4	Negative	Fair	.....
779	34	P. P.	None	Pyelitis(?)	Negative	Negative	Pyridium	4 days	1	Improved	Good	No
1909	37	P. P.	None	Pyelitis(?)	Negative	Negative	None		1	Negative	Improved	No

Footnote.—Breast abscess, thrombophlebitis, abscesses of teeth, septicemia (Staph. albus).

Table 3 (Continued)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
2261	30	Preg.	None	Pyelitis(?)	Negative	Hydro-ureter	$NaHCO_3$, Hexa.	50 days	1	Improved	Improved	Yes
3447	43	P. P.	None	Pyelitis	Negative	Puerperal fever	Hexa.	14 days	3	Positive	Died	Yes
3956	34	P. P.	None	Puerperal infection	Negative	None	Urolithia		3	Negative	Good	No
4078	28	P. P.	None	Pyelitis	Negative	Nephritis	$NaHCO_3$ Hexa.	7 days	1	Improved	Improved	Yes
4257	33	P. P.	None	Pyelitis	Negative	Pulmonary Tb.	None		1	Few pus cells	Good	No
4926	29	P. P.	None	Pyelitis(?)	Negative	None	None		1	Negative	Good	No
5343	25	P. P.	None	?	Negative	Pre-eclampsia	None		1	Negative	Good	No
5496	18	P. P.	None	———	———	Malaria	———	———	1	———	Good	———
5673	34	P. P.	None	Retention of urine	———	Endometritis	———	———	1	———	Good	———
6390	19	P. P.	None	———	———	Breast abscess	———	———	1	———	Good	———
6775	37	P. P.	None	———	———	Endometritis	———	———	1	———	Good	———
7376	19	P. P.	None	———	———	Endometritis	———	———	2	———	Good	———
7383	33	Preg.	None	Vomiting	———	———	———	———	2	———	Good	———
8037	27	P. P.	None	———	———	Mastitis	———	———	1	———	Good	———
8069	20	Preg.	None	Cystitis	———	Vaginitis	———	———	3	———	Good	Yes
8077	38	P. P.	None	———	———	Pelvic cellulitis	———	———	1	———	Good	———
8127	23	P. P.	None	———	———	Fissure of nipple	———	———	1	———	Good	———
8193	42	P. P.	None	Abortion	———	———	———	———	1	———	Good	———
8319	16	Preg.	Yes	———	———	———	Hexa.	1 mo.(?)	1	Many W.B.C.	Good	———
8357	31	P. P.	None	———	———	Endometritis	———	———	1	———	Good	———
9151	21	P. P.	None	Retention of urine	———	———	———	———	1	———	Good	———
9455	28	P. P.	None	———	———	———	———	———	1	———	Good	———
1238	31	P. P.	None	Cystitis	———	Abortion, incomplete	$NaHCO_3$	9 days	1	———	Good	———
7834	20	P. P.	None	———	———	Endometritis	Pyridium	3 days	1	———	Good	———
1804	21	P. P.	None	———	———	———	———	———	1	———	Good	———

Table 3 (Concluded)

Table 3 (Concluded)

Case Number	Age	Preg. or P. P.	History of Previous Infection	Diagnosis	Predominating Organism	Complications	Drug	Length of Treatment	Bacteriological Cultures Made	Urine Findings After Treatment	Condition on Discharge	Cystoscopy
8308	20	P. P.	None	.....	.....	Septicemia, peritonitis	Pyridium	2 days	2	Negative	Died	.....
3116	28	P. P.	None	.....	.....	.....	.....	.....	1	.....	Good	.....
9421	22	P. P.	None	?	.....	.....	.....	.....	1	Negative	Good	.....
4211	21	P P.	Yes	*						Negative this time	Good	.....
9721	24	P. P.	None	.....	.....	Infected episiotomy	$Hexa.-NaHCO_3$	3 days 6 days	2	.....	Good	.....
9771	19	P. P.	None	Cystitis(?)	.....	None	.....	.....	1	.....	Good	.....
9658	27	P. P.	None	Hyperthyroid	.....	.....	.....	.....	1	.....	Good	.....
9719	18	P. P.	None	.....	.....	.....	.....	.....	1	.....	Good	.....
223	22	P. P.	None	.....	.....	Septicemia	.....	.....	1	.....	Good	.....
8474	20	P. P.	None	?	Negative	None	.....	.....	1	Negative	Good	.....

*See previous record of B. coli infection which continued during early part of this pregnancy.

ridium is discontinued and the colon group is combated by the continuation of acid sodium phosphate and hexamethylenamine in alternation with alkali therapy.

Early in the series you will note a few cases treated with pyridium which were found to have negative cultures, although there were certain urinary symptoms. When the results of the cultures were obtained, pyridium was discontinued. As a control for this whole series urine cultures were obtained in a total of 55 patients who had minor urinary complaints, and the cultures were all negative.

In numerous cases the anaerobic streptococci were found in the urine cultures. These are considered to have contaminated the bladder during catheterization, as these organisms are known to be present in the vaginal flora, including the area about the urethra (Brown,[15] Soule and Brown[16]).

SUMMARY

(1) The incidence of urinary infections in pregnancy and the puerperium is considerable.

(2) The colon bacillus was present in 62 per cent of the cases in this series.

(3) When urinary infections are due to the presence of cocci alone, our routine treatment, on the basis of this investigation, is pyridium by mouth. In a few cases, bladder instillations of pyridium are also given. The results have been uniformly good.

(4) In cases where the urinary infection is due to cocci and bacilli, pyridium is given in conjunction with hexamethylenamine and acid sodium phosphate; with the disappearance of the cocci from the urinary tract pyridium therapy is discontinued, although it is necessary to continue the treatment with hexamethylenamine and acid sodium phosphate in alternation with alkalis.

(5) In cases of infection due to the colon organisms, patients have improved clinically with the use of pyridium, but cultures continued to show the presence of the offending bacillus in considerable number.

(6) In order to follow out this treatment, it is not necessary to have cultures on these cases. A carefully made smear of a catheterized urine specimen is sufficient to make the diagnosis.

(7) As yet, we have not found the ideal urinary antiseptic, but we believe that this method of treatment of urinary infections is a step in the right direction.

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DISCUSSION (*Abstract*)

Dr. H. W. E. Walther, New Orleans, La.—The fact that we have not as yet discovered an ideal urinary antiseptic should not deter us from exerting every effort in attaining this final goal. Many feel that the ultimate drug that is to accomplish the results demanded in perfect urinary antisepsis will come from the dye group.

For the past five years I have employed pyridium in some 3,000 cases of urinary infections. Prior to this experience I had been using urotropin, neutral acriflavine, capricol, and other so-called urinary antiseptics. No drug so far advocated, for oral administration, compares with the clinical results obtained with pyridium. I consider urotropin given by mouth most variable in its effect; however, when given intravenously it not infrequently acts advantageously. In mixed infections we find small doses of neoarsphenamine, intravenously administered, at four-day intervals, an additional support to the pyridium therapy.

In the past practitioners have frequently given the older drugs for months at a time in order to attain results. Today the same practitioners condemn the newer dyes unhesitatingly after the patient has taken 100 tablets without eradication of the infection. To me this is grossly unfair. If the clinician were more patient and submitted the dye antiseptic to more prolonged use, better results would ensue.

I was interested in Dr. Brown's remark that patients "feel better" while taking pyridium. We have observed this repeatedly in our practice, but are unable to explain it, except that the drug diminishes the toxemia.

A word as regards the nausea some patients experience in taking pyridium. We have found that where an alkali is used in conjunction with the pyridium gastric upset is largely obviated.

Dr. Brown (closing).—We still use pyridium routinely in urinary infections due to cocci, though the cases reported in this paper include only those up to 1931.

In the infections due to organisms of the colon group, we continue to use the treatment with alkalis alternating with hexamethylenamine. The average duration of the treatment with pyridium in this series was found to be 7 1/5 days. It was also noted that in cases infected with the colon group the disease was attenuated by the use of pyridium, but the diminution in the number of organisms was slight if it existed at all.

In these cases, Dr. Rose has been rather conservative in the use of the cystoscope, and we are using it less and less on our service except where the clinical course makes further investigation necessary.

In this investigation we have used only the "Council Accepted" product.

THE PROPHYLAXIS OF FUNCTIONAL MENTAL DISEASE*

By LAWRENCE F. WOOLLEY, M.D.,
Towson, Md.

The problem of prophylaxis in functional mental disorders is to be approached with some diffidence. Our justification for "rushing in" lies in the overwhelming extent of these disorders. Statistics show that over 50 per cent of all patients in hospitals[1] combined in the United States are patients with mental disease and over 50 per cent of the mentally ill in hospitals[2] are suffering from disorders generally thought to be functional such as schizophrenic and manic depressive psychoses. Briefly, these figures interpreted mean that somewhere between one-fourth and one-third of all hospitalized patients in the United States are sufferers from the types of illness whose prevention is the theme of this paper. And this does not include the large number of those milder forms of functional mental disturbances which are treated by specialists and general practitioners outside of mental hospitals, and which are estimated to have an incidence in general medical practice of some 50 to 70 per cent[3] of all patients seen.

In the light of these facts one is impressed by the relative lack of attention to the problem and the relatively small sums available for research, prevention, general education and propaganda to better the conditions. When we compare the situation in regard to cancer, tubercu-

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*On account of limitation of space, four case reports have been omitted.

losis, thyroid disease and cardiac disease, we must be surprised that this group, numerically so much greater, has had so little attention paid to it. Here, as in the forms of disease mentioned above, early recognition and treatment give the best prospect of recovery and similar programs to those utilized in the other fields might be expected to yield somewhat similar results.

But there are grave dangers in attempting improvement of the conditions if one expects or promises too much. After all, we know very little concerning the etiology of functional mental derangements and what theories are available as to causation are highly speculative and based on the study of few cases. The older descriptive psychiatry led to a great emphasis on the hereditary factors, factors which were already present at the birth of the child and could not be expected to be materially altered. The only prophylaxis here would seem to lie in eugenic approaches such as the sterilization program so enthusiastically developed and followed out in California and other states.[4] The validity of the viewpoint remains to be demonstrated. The psychoanalytic theory which attributes the etiology of these disorders to specific sexual factors in the life development of the child offers somewhat more in that one might undertake the sexual training and education of the child along lines which would steer clear of the specific traumatic experiences constituting the rocks upon which the individual breaks. But these ideas have been developed on the basis of the study of so few cases that their validity is highly questionable and the mode of application not yet worked out. One would seem to have a better chance of getting somewhere with the problem if one would stick to such common sense and practical viewpoints as the genetic, dynamic approach advocated by Dr. Adolf Meyer. Here one considers the origin of these problems of behavior as the result of the reaction of the individual as a whole to the totality of his life experience and sees the specific behavior problem manifested as having its genesis in habit patterns of response laid down in early life as reactions to definite situations and retained by the individual because of their utility in the situations where they have been called forth. This leads us to the intensive study of the individual case with a view to unearthing the developmental history of the illness in more or less objective terms and in items of life experience that can be verified. It also leads us to the viewpoint that it might be possible, in some cases at least, to alter the habit pattern of response along lines more suited to social adjustment.

It seems we have to say that to date no one has succeeded in proving the prevention of mental illness in any specific instance.[5] This, no doubt, is due to the difficulties of the task. If the patient has not already developed mental disease, it is impossible to prove that he would have done so had psychiatry not intervened for we can point to no acceptable specific etiology that would make it inevitable. If he has already developed a mental illness, the illness has not been prevented. Moreover, if the patient has been seen early in a mental illness and makes a recovery, it is extremely difficult to prove that what we have done has determined that recovery. We are all quite familiar with numbers of individuals, apparently quite normal, who at some time or other in their lives presented reaction patterns that seemed to indicate either the imminent advent of serious mental disorder or its incipiency. Among them are many who, without any special intervention, have weathered through the storm to well integrated adult life.

Moreover, the problem of prevention does not lend itself to statistical study at present. As a matter of fact, actual experience shows that with the increase of facilities for the early recognition and care of mental disease, the number of patients hospitalized in chronic mental hospitals increases rather than otherwise.[6] To be sure, this increase can probably be explained by the demonstrable fact that the incidence of hospitalized mental patients from any given source is in inverse ratio to the distance from mental hospital facilities.[7] Where there is a fairly adequate provision for the care of mental patients (such as in New York), it can be shown that approximately 1 out of every 22 persons[8] in the total population at some time or other in life develops a mental illness demanding hospital care. Expectancies much smaller than this are characteristic of those communities which are most poorly equipped to handle the problem and increase with increased facilities.[9] The reason, then that we have an increase in the number of hospitalized cases when we build a psychopathic hospital with a view to early treatment and prevention is partly that we tap the great accumulation of uncared for cases which have been allowed to exist unhospitalized in the community because of the lack of treatment facilities for them. It is not that the program does not tend to prevent mental illnesses, but that it is impossible at present to utilize the

statistical method in proving it. On the surface it appears that the advocates of mental hygiene programs have promised more than they can deliver and perhaps this leads to a feeling of distrust in the minds of the populace in general.

Realizing obstacles to achieving our task and without any hope of proving conclusively the viewpoint we advocate, we are, nevertheless, impelled to a discussion of this problem of prevention for the reason that certain of our cases show a life development wherein there were periods at which it seems intervention might have resulted in a different outcome.

Case 1.—Y. R., an only child, was from infancy spoiled, overindulged and waited upon by her paranoid mother. She was considered both precocious and beautiful. Used to the satisfaction of her every whim and much attached to the psychotic mother, she was deeply impressed by the latter's accusations of immorality and infidelity against the father. She was headstrong and subject to temper tantrums. Prior to the onset of her menses at the age of 12 the mother had threatened divorce proceedings and had instructed the patient to testify that her father had incestuous relations with her in order that the mother might secure custody of the child. Adolescence inaugurated a period of profound sex curiosity with an interest in sophisticated sex novels and many contacts with boys. Friendships with girls were not satisfactory because of her unstable emotions, overtalkativeness and overconfiding manner. Commitment of the mother to a state hospital when the patient was 14 resulted in the patient being sent away to boarding school where she withdrew into herself and gradually developed a depression with some delusions and misinterpretations of the environment. It is doubtful if the patient has been entirely normal since then. The illness has run a fluctuating course and during the better periods she has been able to attend school and do fairly good work in subjects that were not too exacting. She was admitted to the Sheppard and Enoch Pratt Hospital at the age of 18 shortly after the close of the school year and immediately following a dramatic attempt at suicide as the result of frustration of a somewhat autistic love affair. She continues to show fluctuations in her illness and, during her more disturbed periods, dissociation and autistic phenomena have become more pronounced.

We are interested primarily in the exhibition by the patient of behavior characteristics indicative of an inadequate mental hygiene program. It is clear that the early home life and training were not of a type calculated to equip her for normal adjustment to the world of reality and it is conceivable that a different sort of preparation for life might have made it possible for this child to use her natural resources of intelligence and ability in meeting her difficulties. On the other hand, it is not surprising that being forced to face the world suddenly, without the protection and the support of her mother and with inadequate equipment, this child should have developed an illness along the lines indicated. In this connection we point out the pernicious influence exerted by abnormal and psychotic parents upon their children. We have seen a case of *folie a deux* induced in the child of a paranoid mother through the overdependent relationship between them. In this latter case the girl made a fairly prompt recovery when at the age of 35 she was separated from her mother and subjected to a course of intensive treatment aimed at rehabilitating her social and personal habits.

Case 2.—Q. R., a Jewess of 17 years, was admitted to the Colorado Psychopathic Hospital on November 10, 1928. She was one of twins from separate ova. All the children in the family were red haired except the patient who had black hair and very dark skin. The mother was of an unstable, cyclothymic make-up. The father and grandparents were fairly stable but all of the siblings are somewhat "nervous and easily excitable."

From birth, which was uneventful, the family tended to give much attention to the twin sister, first because she was ill and had eye trouble and then because she resembled the rest of the family much more than did the patient who found herself rather neglected. She was docile, social in her attitude but was subjected to many unfavorable comparisons. By the time they were six the twins started school and because of their small size there was some argument as to whether they should enter the first grade, the family insisting upon it and the school authorities objecting. A compromise was reached in which the red-haired twin entered the first grade and the patient was placed in the kindergarten. Although the patient resented this she said little about it but manifested marked disinterest in school. "She never tried to get any subject herself. She insisted on having help." By the time she was 8, although she had made normal scholastic progress, she began to play and associate with children younger than herself and manifested a dislike for the company of children of her own age. The red-haired twin made a rather brilliant school record and was prominent in all the activities, but the patient did not participate in any of these. She began to talk of being different from other children, said that her sister was treated better than herself and began to show stubborn and negativistic trends. All of this was much aggravated by the family attitude which tended to emphasize the unfavorable comparisons, begun earlier in life, by comments, "Why don't you get your lessons as your sister does?" "Why don't you win prizes in school?" *et cetera.* By 11 she was remaining by herself a great part of the time and felt that her sister was given the best of everything. She would work spontaneously at the housework, but would do nothing she was asked to do. The menses began at 14 without any special reaction on her part. She graduated from the grades before her fifteenth birthday and entered high school in the mid-year, but attended only two days because she thought the other children were making fun of her. She became sullen and almost continuously quiet except for interruptions of her placidity by her temper outbreaks. After a year of this the oldest sister returned home with her husband who was dominating and officious. He decided "to

take the patient in hand," and tried to prod her into activity by teasing, comments and criticisms which only increased her sulkiness, resentment, and withdrawal. She developed paranoid ideas about the family, suspecting them of poisoning her food. The culmination was a serious quarrel with her mother resulting in the onset of frank catatonia. After five months of intensive hospital treatment she was taken home but her stay there was terminated by a violent impulsive outbreak with the threat to murder her sister, resulting in her commitment to a state hospital for custodial care where she remains. The twin continues to make a very acceptable social adjustment.

The differences in the outcome of the lives of these two children are only partly accounted for on the basis of different constitutional inheritance. What difference existed became important because of the attitude of the environment. It seems likely that, if the patient had been managed with a little more consideration for her emotional needs, something might have been done early to prevent the serious outcome. From a mental hygiene viewpoint warnings of the impending disaster were present from early childhood and should have pointed the way to some correction of the stresses under which the child labored.

Case 3.—K. E. is a white girl of 14, admitted to the Sheppard and Enoch Pratt Hospital, February 4, 1932. She is the youngest child in a family consisting of temperamental parents and two older, self-willed brothers of ages 24 and 22. The paternal grandfather is said to have had a very violent temper. The maternal grandfather deserted his wife who is reputed to have been an adventurous, extravagant, scandal-monger who married four times and raised the patient's mother to be irresponsible and extravagant like herself. The father was strict with the boys, and although he tended to favor the daughter, he frequently displayed very violent temper toward her if she thwarted him. He was a very unstable man, bursting into tears frequently while giving a history. The patient's mother was nervous and high-strung and described by the father as "a hysterical type." She is said to be unusually selfish, demanding attention from the children and jealous of any affection exhibited toward them by the father. She neglected them and was impatient with any faults she thought she detected. Her life has been described as "for many years it has been a routine of eating, sleeping, going to the movies and playing bridge." The patient grew up practically ignored by the mother, overindulged by the father and excessively supervised by the siblings.

Sex information was withheld from her by the family and at 12 she was upset when boys at school teased her over her ignorance. Menstruation began at 13 and was not accompanied by any unusual phenomena. About this time she began to make marked emotional attachments to older girls and to show some interest in boys all of which was frowned upon by the family who did not hesitate to suggest that there was something immoral in these relationships. She began to manifest resentment and dissatisfaction with other members of the family, to protest against the quarreling between her parents and the tendency of the brothers to dominate her, complaining that they interfered with her wishes, ransacked her room and read her private diary without her permission as well as humiliating her in company by criticisms of her personal habits and conduct. Twice during the six months before her admission to the hospital she left home stating that she wanted to be independent and go where she would be allowed to use her own judgment. About a week before her admission she did not return home until 2 o'clock in the morning and explained this by a made-up story about being picked up by boys. Also during the month before admission she had two fainting spells which were suggestive of hysteria and served the purpose of avoiding a scene with her father.

In the hospital, as long as indulged, she exhibited few spoiled child reactions but when thwarted or disappointed, she developed various illnesses. Throughout the latter part of her stay she showed some insight into the motives guiding her and determining her conduct so that even in casual interviews it was possible to get her to express ideas of the inappropriateness of her actions, and this was accompanied by a marked improvement in behavior.

As to prophylaxis, the child was already showing emotional responses of divergent character as early as the age of 10 when she would have violent temper tantrums and would stamp her feet and scream. A year and a half before admission to the hospital she developed a twitching of her face which grew worse the more her attention was called to it. Possibly intervention at either one of these periods might have avoided the ultimate crash of the patient into mental illness, the pattern of which seemed in part derived from the mother who staged dramatic fainting spells and "hysterical" scenes. It would seem that an intelligent child, exposed to so frustrating an environment would of necessity acquire reactions of this type when she found them so useful in controlling the father's reaction toward her. In attempting to prevent such a reaction one would either remove the child from the fostering environment or try to modify that environment in such a way that the reactions could no longer gain the desired ends. That prevention might have succeeded is indicated by the improvement in a neutral environment.

The thesis of a possible prophylaxis for such conditions is rendered more probable when one considers the cases of children who have shown strikingly similar developments in their life situations in which intervention took place and psychosis did not develop although it seemed imminent. Perhaps in some of these cases it would have been wiser to speak of early treatment rather than prevention but in most of them the mental reactions shown appear to fall somewhere within the range of normal reactions and we must find somewhere in the normal room for the inclusion of certain rituals, certain worries or even the development of some delusions or hallucinatory experiences. The borderline is not sharp and distinct. In our opinion these children could not be considered as already psychotic although the nearness to psychosis was apparent.

Case 4.—L. J., a Greek girl, the first of four siblings, aged 10 years and 9 months, was admitted to the Cleveland Child Guidance Clinic February 12, 1931. She had been treated on and off in a general hospital clinic for over a year for a series of spells in which she refused to eat or talk or walk and would lie in bed with her eyes closed, moaning and complaining of headache and pains in her leg and foot. The family name was conspicuously Greek and since the children in the neighborhood teased her about it she had a great deal of conflict over it. Overindulged with clothes and candy at home, but markedly restricted in her social outlets due to the attitude of her family and the neighborhood, she felt much frustrated because she was essentially outgoing and liked to be with other children. A trip to her godmother's resulted in even greater frustration and discomfort and culminated in a serious crying spell for which she was promptly returned home. She developed headache and car sickness on the trip. The family called in a physician who found infected tonsils and operated upon her. Following this she was treated very much as an invalid by the family, given everything she wanted, including a great deal of attention. Return to school and teasing by her classmates precipitated subsequent spells of headache and invalidism. On being hospitalized she was given greater freedom of play and social activities and promptly recovered from each spell but return home was quickly followed in each instance by return of symptoms. In her own words, "I get lonesome and want someone to play with and get to worrying and my head hurts. When I have lots of girls to play with I don't think about it. All day long I sit there at home. I have lots of toys but I can't play alone. Out at the hospital there's a whole ward of boys and girls. We play together and the nurses read to us and we forget. I found that out myself." Normal physically, and of better than average intelligence, the mechanism of the illness is quite clear, being very simple. A careful program of education of the family and socialization of the patient resulted in recovery with insight after a period of a few months and there has been no tendency to recurrence of symptoms for a period of more than a year.

Case 5.—E. L., a white boy of 15, the fourth of 5 living children, was brought to the Cleveland Child Guidance Clinic on November 5, 1929. His mother was concerned about him because he was "nervous," could not concentrate and did not associate with other children. She described him as being odd, ugly, irritable, and the only difficult child in the family. She considered him secretive and evasive. The parents were aware that the boy resented what he felt was favoritism shown to his younger brother toward whom he manifested hatred. He felt himself abused and discriminated against. The family was much concerned about masturbation which had been observed two years previously and which was suspected to have continued.

In many respects this boy was similar to many other cases seen at the Clinic and described as "schizoid personalities," not because of any manifestation of psychotic symptoms but because of a more or less complete withdrawal from normal associations with others of his age, giving some evidence of retiring into a world of his own. Nevertheless, he discussed his difficulties fairly well, at least on a superficial level.

Study revealed that the mother was much upset by the father's drinking and during her pregnancy with this child she had been particularly unhappy on this account. She thought the boy much like his father and this the boy had accepted. He considered his father and himself nagged by the mother. Remarks by her indicated that she disliked him from infancy as she described him as "nasty" even when a little baby.

The boy revealed a considerable feeling of inadequacy and was particularly concerned over masturbation which he had tried to overcome by "will-power" unsuccessfully. He discussed it with emotion and tension and felt inferior to others on account of it so that he had little desire either to enter into associations with others or face his situation at home. His interests were primarily solitary ones, reading and experimenting with mechanical things.

He was carried for a little over two years in the Clinic during approximately the last year of which he was adjusting quite normally. The important things in his readjustment appeared to be an opportunity to aerate his conflicts, with repeated going over this material with him and a very frank exposition of sound sexual theory. More activities were provided for him by developing his special interests at school, obtaining employment for him at the library and paying particular attention to socializing experiences which were expanded as he was able to tolerate them. It was felt that it was necessary to provide a sufficient reality contact to keep him in orientation with the world about him and it was interesting to observe, during his period of re-adjustment, rather successful attempts at turning his solitary pursuits into channels potentially very useful to society.

We must note in this case that the conflict in the sexual sphere was of sufficient moment to be very disturbing to his progress toward normal adult adjustment. It is the type of material from which many schizophrenic reactions develop. No pretence is made that this boy would inevitably have developed such a psychosis had intervention not taken place. Such a contention would be unjustified. What is insisted upon, however, is that the likelihood of such a development has been much decreased by rather common-sense assistance to this boy in working out his problems.

DISCUSSION

Speaking before the Colorado Society for Mental Hygiene, July 13, 1929, Doctor Adolf Meyer said:

"We come in these days particularly to the recognition that perhaps it is better not to think too exclusively of the final outcome but to learn to think a little more in all modesty of the apparently trifling things that appear here and there; to learn to occupy ourselves with these apparently trifling things and take them for what they are worth; dealing with trifles that the average person brushes aside as unimportant, that to my own thinking usually come out all right

but sometimes do not, but the kind of thing that deserves study with a well balanced spirit and the result to be utilized with judgment." He goes on to comment on the prominent place sex has come to occupy in mental hygiene thinking: "——and the idea very largely prevails that the study of sex and the transformation of our whole philosophies of life in terms of it is in itself the necessary channel through which mental hygiene will have to come. I would like to emphasize that we have indeed learned a great deal by learning to respect the facts of sex but we have also learned a good deal by learning to respect a good many other facts of human life."

So much has been written of late years regarding the psychoanalytic implications of early behavior reactions and the child's relationships to his parents that many people have advocated an entirely psychoanalytic approach to the problems of child training. We should not be misled by this into a feeling that nothing can be done except on such terms, for such an attitude would leave us quite hopeless in attempting to meet the problem as we actually have it and see it. There are not sufficient psychiatrists altogether to handle this problem as it stands today and there are so few who are properly trained for analytic psychiatry that only a small fragment of the cases now being handled could be adequately cared for on such a basis. Moreover, experience indicates that attention to some of these "apparently trifling things" may lead to a solution, not only of the immediate behavior problem, but perhaps also, coincidentally, of the child's relationship to his parents and sexual life.

That sexual implications are involved seriously in many of our cases cannot be denied. Practically every case in this report shows some involvement of the sex life and there can be little question that abnormal relationships to parents such as have occurred in all of our cases may lead to devastating results in the ultimate adjustment as shown particularly in *Cases 1* and *5*. But sex was not the only important thing in these constellations and in many more of our cases it was clear that abnormal behavior on the part of neurotic or psychotic adults in the environment had played a leading role in the perpetuation of a similar reaction in the child. Surely these are things that are accessible to the understanding of all of us, and to do something about interrupting the vicious circle which passes these reactions on from generation to generation through a sort of social inheritance we need not wait for some idealistic future in which psychiatrists will be plentiful and all will be psychoanalytic.

We recognize a great many flaws in the type of presentation of case material resorted to in this report but more detailed presentation requires a prohibitive amount of space if any number of cases is to be presented. What has been striven for here is a simple elucidation of the fact that in all of these cases: (1) symptoms were evident long before skilled attention was brought to bear on the problems of adjustment of the child. (2) We have some evidence of the multiplicity of factors at play in the development of abnormal behavior patterns, indicating that the behavior manifested is a result of the reaction of the total personality to the total stimuli playing upon it. (3) The environment of childhood is dominated by the parents or the supervising adults and the attitudes of these assume profound importance in determining the ultimate adjustment or mal-adjustment of the patient. (4) Stories similar to the life experiences of these individuals are of sufficient similarity and frequency to be recognized by almost everyone. (5) Such situations should be readily recognizable by the family physician which fact places upon him a certain obligation to intervene, if possible, in some way that might lead to a prevention of mental illness by improving the mental hygiene of the environment.

Our discussion occupies itself with the interrelationships of these various points. The obstetrician who may have a woman who is pregnant with an unwanted child; the pediatrician who encounters marked discrimination on the part of the parents toward the children in the family he is attending; the gynecologist who is treating a woman for a chronic pelvic condition which keeps her in a state of more or less continuous pain and a fear of losing her ability to have children through an impending operation; the general practitioner or the "nerve specialist" who is called in to attend to a neurotic, unstable parent; or, in general, any physician who encounters abnormal emotional states in his patients, can be certain that these will have their effects upon the children exposed to their influence with a high degree of probability that the influence will be unfavorable for efficient life adjustment rather than otherwise. Since prevention appears to be a much more easily accomplished goal than the treatment of these conditions, it seems undesirable that the physician should close his eyes to these implications or that he should deny his responsibility therefor. It

would seem that he has here the same sort of responsibility to the community that he has when he reports a case of typhoid fever. Undoubtedly, many of these conditions could be adequately handled by the physician himself, if he but took the time and opportunity to recognize them and do something about them, but even if he is reluctant to undertake them himself as cases for treatment, he should at least make the family aware of the existing situation, of the advisability of doing something about it and inform them of where they might go for help.

We do not intend to minimize the importance of the spread of mental hygiene clinics, the improvement in the teaching of psychiatry in medical schools, the improvement in state hospitals and private hospital care, and the building of psychopathic hospitals and out-patient clinics for the treatment of acute mental illnesses and the general spread of the mental hygiene program to the education of parents and teachers with the provision of mental hygiene facilities in public schools, high schools and colleges. These are of fundamental importance in the program of prophylaxis, but they receive continuous attention at more competent hands than mine. The role of the physician actually practicing in the community seems to me a more important factor and one that has been relatively somewhat neglected. It is for this reason I have elaborated on this topic in this paper more or less to the exclusion of others.

SUMMARY

In view of the serious importance of functional mental illnesses both from the standpoint of numerical predominance over other forms of illness and from the standpoint of their disrupting effects upon the life history of the patients themselves and of those with whom they come in contact, whatever can be done in the direction of prevention becomes a necessity. A few cases are presented indicating typical environmental situations conducive to the development of mental illness and containing internal evidence that the course of events might have been predictable sufficiently long before the advent of actual illness so that preventive measures might have been instituted. It is pointed out that the general practitioner, the obstetrician, pediatrician and other specialists who come in contact with family situations might easily become aware of impending disasters of this type and either undertake measures themselves to prevent such an outcome or direct the family to an appropriate source of help. It is not intended that this should be construed as meaning that all functional mental diseases can be avoided. What is intended is that something might be done to mitigate the situation if physicians in general were more aware of its importance, its detectability and the potentialities of prophylactic or early treatment.

ACKNOWLEDGMENTS

I am indebted to Dr. Franklin G. Ebaugh, Director, Colorado Psychopathic Hospital, Dr. Henry C. Schumacher, Director, Cleveland Child Guidance Clinic, for the use of some of the case material presented from their services; and, to Dr. Ross McC. Chapman, Medical Superintendent of the Sheppard and Enoch Pratt Hospital, for case material and for advice in preparation of the manuscript.

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See also:

Proceedings of the First International Congress on Mental Hygiene, published by the International Committee for Mental Hygiene, New York, 1932, the following papers:

Emerson, Haven: The Magnitude of Nervous and Mental Disease as a Public Health Problem, p. 209, vol. 1.
Brown, Frederick W.: A Statistical Survey of Patients in Hospitals for Mental Disease and Institutions for Feebleminded and Epileptics in 32 Countries, p. 777, vol. 2.
Rudin, Prof. E.: The Significance of Eugenics and Genetics for Mental Hygiene, p. 471, vol. 1.
Strecker, Edward A.: Psychiatric Education, p. 638, vol. 1.
Hincks, C. M.: Public Education and Mental Hygiene, p. 564, vol. 2.
Raemer, Hans: To What Extent Does Public Opinion Help and to What Extent Does It Impair the Work of Mental Hygiene, p. 266, vol. 1.

DISCUSSION (*Abstract*)

Dr. Leslie B. Hohman, Baltimore, Md.—Dr. Woolley's paper presents a common sense point of view. He very wisely does not pretend to a knowledge of the actual etiology of the so-called functional psychoses, but believes in following the doctrine as laid down by Adolf Meyer to the effect that life experiences of the individual play a dynamic role in the development of mental disease. Dr. Woolley apparently subscribes to the notion,—and in this I think him correct,—that if we arrange the important factors of the individual's life in chronological order, we may be able to find leads which will point a way to the correction of bad

habits in the particular case considered, and that we shall learn from the cases so studied ways to prevent the development of more serious conditions in other patients who have not yet arrived at the psychotic state.

I subscribe most thoroughly to his belief that we must educate physicians who are not directly occupied with psychiatry. After all, it is frequently too late to do any prophylactic work when cases have reached the psychiatrist. We shall, therefore, have to undertake a more intensive educational campaign with non-psychiatric physicians and shall have to work for a closer cooperation between psychiatry and the other branches of medicine.

Dr. James A. Becton, Birmingham, Ala.—Prophylaxis in functional mental diseases is discouraging when compared to the progress made in other lines of medicine.

There are two methods of prevention of functional mental diseases: (1) the adjustment of the individual to his environment; and (2) the sterilization of mental defectives.

The first method has been ably outlined for us by Dr. Woolley and is undoubtedly the best method at our disposal at the present time. So far, neither of these methods has been very effective as is evident by the rapid increase in the development of functional mental diseases.

There is a great deal of opposition to the more radical method, sterilization. However, the fact that twenty states now have legislation permitting the use of this method indicates that public opinion is becoming more favorable toward this plan.

Admitting that no one plan is sufficient to stem the tide in this great medical problem, it occurs to me that a combination of all plans should be resorted to if we are to be able to show a definite decrease in the development of functional mental diseases.

Dr. Frank H. Luton, Nashville, Tenn.—Dr. Woolley's paper is a distinct contribution to us in that he has presented something concrete in the field of the prevention of mental disease. I feel that it is through a consideration of the total personality with all that this implies that the most sensible approach to the practice of mental hygiene will be attained.

It is significant that at this meeting of the Southern Medical Association the Chairman of the Section on Pediatrics is presenting a paper on mental hygiene. It means that the pediatricians are waking up and that in the future we shall and should come close together in our management of this field and that the problem will benefit from a mutual attack.

Dr. Woolley (closing).—Sterilization as a prophylactic measure has been mentioned several times and I should like to go on record here as being absolutely opposed to programs for blanket sterilization, although I would not be opposed to an experimental program that was carefully worked out and controlled, such as might be carried out under the present laws in California. The rapid spread of sterilization to a large group of states seems to me a dangerous thing, particularly as it is apt to distract our attention from issues that seem to me more fundamentally important.

NEUROSYPHILIS: AN ANALYSIS OF VANDERBILT UNIVERSITY HOSPITAL MATERIAL OVER A PERIOD OF SEVEN YEARS*

By W. M. DEDMAN, M.D.,
and
HUGH J. MORGAN, M.D.,
Nashville, Tenn.

INTRODUCTION

Shortly after the reorganization of the Vanderbilt University Hospital in 1925, a special clinic for the diagnosis and treatment of syphilis was developed in the medical out-patient department. This clinic employs the same general plan of organization and administration as the Syphilis Clinic of the Johns Hopkins Hospital. The classification and record systems which we have used are modeled after those which were developed at the Johns Hopkins Hospital and published by Moore in 1930.

During the past seven years there have passed through the Syphilis Clinic of the Vanderbilt University Hospital 385 patients with syphilis in whom the diagnosis of some form of neurosyphilis has been made. We have felt that an analysis of this material would be of interest, especially since similar studies have been reported infrequently in the recent literature. The records of these cases have, therefore, been assembled, subjected to analysis, and the data thus obtained are to be presented. These data are, probably, representative and typical of the experience of other Southern syphilis clinics.

MATERIAL

The material for this study has been drawn from a typical dispensary population. None of the patients could afford the services of a private physician. While a small number of patients were sent in by private physicians, most of them were referred from the general dispensary-hospital population. The latter totaled 41,658 patients during the seven-year period.

At this hospital no patient under 14 years of age is admitted to the Syphilis Clinic. Nevertheless, the records of cases of neurosyphilis in children have been included in our study. For

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*From the Department of Medicine, Vanderbilt University Hospital and Medical School.

this portion of our material we are indebted to Dr. Horton Casparis, Professor of Pediatrics, and Dr. Katherine Dodd, of the Department of Pediatrics.

Only records of patients in whom the diagnosis of neurosyphilis was certain were included in the group for final study. The records of 50 patients were excluded for lack of conclusive serological or clinical proof of central nervous system involvement. Examination of the spinal fluid was not made in 11 per cent of the accepted cases, either for reasons of expediency or because of refusal by the patient. Nevertheless, in none of the 335 cases accepted for final study was there any doubt as to the correctness of the diagnosis of neurosyphilis.

Lumbar puncture is not a routine procedure in all patients attending the Syphilis Clinic. It is employed in every patient before discharge and in selected cases. Undoubtedly if examinations of the cerebrospinal fluid had been made routinely, in all patients coming to the Syphilis Clinic, the incidence figure for neurosyphilis would be much higher. We feel that this would have been reflected in our material by a sharp rise in the number diagnosed asymptomatic neurosyphilis.

Chart I

GENERAL INCIDENCE

Total hospital and clinic population	41,685
Total number cases neurosyphilis	385
Total number cases neurosyphilis accepted this study	335
Incidence neurosyphilis in luetic clinic	6.8 per cent
Incidence neurosyphilis total hospital-clinic population	0.9 per cent
Ratio white to colored in luetic clinic	1 W:3 C
Ratio incidence white to colored of neurosyphilis	3.8 W:1 C

ANALYSES OF MATERIAL

As is shown in *Chart I*, neurosyphilis was present in 0.9 per cent of all individuals admitted to the wards and Out-Patient Department of the Vanderbilt University Hospital. The incidence of neurosyphilis among individuals with syphilis was found to be 6.8 per cent. This figure is almost identical to that given by Stokes for the average city hospital population, and closely approximates Moore's 8 per cent figure for symptomatic neurosyphilis in the Johns Hopkins Hospital material. It is considerably lower than Moore's figure for combined symptomatic and asymptomatic neurosyphilis. As has been stated elsewhere, many of our patients with asymptomatic neurosyphilis escape diagnosis.

At the Vanderbilt University Hospital the ratio of colored to white patients admitted to the wards is 1:6. In the Out-Patient Department, as a whole, the ratio is 1:1.5, but in the Syphilis Clinic this becomes 3:1. This clearly indicates the high incidence of syphilis among the colored race. However, as was to be expected from reports by previous investigators, the incidence of neurosyphilis was found to be much lower in our colored patients than in the white. Our figures show that neuro-axis involvement occurs 3.8 times as frequently among syphilitic white patients as among the colored.

Chart II

INCIDENCE TYPES NEUROSYPHILIS IN GROUP STUDIED, TOTAL 335 CASES

Type Neurosyphilis	No. Cases	Per Cent Total Cases
Parenchymatous 43.87 per cent		
Tabes dorsalis	72	21.19
Tabo-paresis	18	5.37
Paresis	58	17.31
Meningo-vascular 56.13 per cent		
Vascular	27	8.06
Paraplegia (spastic)	5	1.49
Combined system	6	1.79
Asymptomatic	38	11.34
Neurorecurrence	29	8.65
Cranial nerve	41	12.24
Meningitis	12	3.59
Epilepsy	5	1.49
Ant. poliomyelitis	2	.60
Mesencephalitis	1	.30
M-V unclassified	21	6.26

From *Chart II* it is seen that of the 335 cases accepted for study, 148, or 43 per cent, showed evidence of parenchymatous involvement. If the cases diagnosed tabo-paresis (18, or 5.37 per cent) are included with those diagnosed as paresis (58, or 17.3 per cent), we find the parenchymatous cases about equally divided between the tabetic and paretic groups.

One hundred eighty-seven, or 56.1 per cent, of the series were classified under the general heading of meningovascular syphilis. It is noteworthy that 38, or 11.34 per cent, were classified as asymptomatic neurosyphilis. As pointed out elsewhere, this figure would, no doubt, have been considerably higher had we performed routine cerebrospinal fluid examinations on every patient coming to our clinic.

That neurosyphilis frequently manifests itself by isolated cranial nerve disorders is evidenced by the fact that 41, or 12.3 per cent, of our cases were so classified. This figure becomes more impressive when it is stated that, in our classification, the cranial nerve disorders occurring in hemiplegias, tabes, paresis, and so forth, are not recorded in the "cranial nerve" group.

Twenty-nine, or 8.6 per cent, of the series showed acute central nervous system involvement, following lapses in treatment (usually 2 to 12 weeks). This represents an incidence of neurorecurrence in 1.5 to 2 per cent of all cases of early syphilis treated at our clinic. This figure approximates that given by Zimmerman in 1922, but is considerably higher than the 0.2 per cent reported by Moore in 1929. Of these 29 neurorecurrences, 19 had meningitis, 13 had cranial nerve involvement, and 3 had cerebral vascular accidents (1 monoplegia, 2 hemiplegia).

The importance of neurosyphilis as a cause of cerebral vascular disease is indicated by the fact that 27, or 8.06 per cent, of our cases were so classified.

There were 12 (3.59 per cent) instances of syphilitic meningitis, with the symptoms and physical signs of meningeal involvement in whom the condition, apparently, developed spontaneously and was not dependent upon treatment factors.

In the meningovascular group there were 11 cases showing varying degrees of cord involvement. Five of these (1.49 per cent of whole series) were diagnosed "spastic paraplegia." It is interesting that this condition developed in one instance following a four weeks lapse in treatment, and probably represents a neurorecurrence. The remaining 6 cases (1.79 per cent of whole series) showed evidence of both pyramidal tract and posterior column involvement, and were classified under "combined system" disorders.

Chart III*

INCIDENCE TYPES AS TO SEX AND COLOR

	White		Colored	
Type Neurosyphilis	Male	Female	Male	Female
Tabes dorsalis	48.3	11.5	34.7	4.1
Tabo-paresis	50.	11.1	27.7	11.1
Paresis	55.1	18.9	24.1	1.7
Vascular	25.9	18.5	37.	18.5
Paraplegia (spastic)	60.	.....	40.	.....
Combined system	50.	33.3	16.6	.....
Asymptomatic	36.8	21.	34.2	7.8
Neurorecurrence	34.4	17.2	41.3	6.8
Cranial nerve	31.7	9.8	48.7	9.8
Meningitis	25.	16.6	50.	8.3
Epilepsy	20.	20.	40.	20.
Ant. poliomyelitis	.....	.....	100.	.....
Mesencephalitis	100.	.....	.....	.....
M-V unclassified	33.3	.....	57.1	9.6
Totals	40.8	14.6	36.4	7.3
	55.5		44.5	

C. N. S. occurred ratio: 3.8 white to 1 colored.

*In this and subsequent tables the figures represent percentages, unless otherwise designated.

Chart IV

HISTORY OF INFECTION

Type	No. Cases	Primary or Secondary	Previous Pos. WaR.	Previous L. P.	Previous Luetic Diagnosis	Marital	Previous Treatment
Tabes dorsalis	72	47.2	22.2	4.5	31.9	31.9	33.3
Tabo-paresis	18	61.1	61.1	11.1	61.1	38.8	72.2
Paresis	58	43.2	41.3	8.6	43.2	36.2	51.7
Vascular	27	29.6	29.6	14.8	21.1	29.6	37.
Paraplegia	5	40.	60.		60.	20.	40.
Combined system	6	33.3		33.3	16.6	33.3	
Asymptomatic	38	55.2	39.4		42.1	23.6	57.6
Neurorecurrence	29	93.1	86.2		89.6	6.8	100.
Cranial nerve	41	69.7	19.5	2.4	17.	24.3	24.3
Meningitis	12	58.3	25.		16.6		16.6
Epilepsy	5	20.				20.	
Ant. poliomyelitis	2	50.	50.		50.		50.
Mesencephalitis	1	100.				100.	
M-V unclassified	21	52.3	38.		38.	4.7	47.6
Total	335	52.2	36.7	5.3	36.1	25.6	42.6

Though 5 cases of meningovascular syphilis with epilepsy were encountered, there was only one instance in which the association of the two conditions seemed to be more than incidental. In this case the atypical epileptiform seizures seemed to have been terminated by antiluetic treatment.

The relatively large number of unclassified meingovascular cases (21, or 6.26 per cent) is a reflection of the critical attitude of our personnel regarding diagnosis.

Although it is seen from *Chart III* that of the total group studied 55.5 per cent were white and 44.5 per cent colored, allowance must be made for the fact that for every white patient in attendance at our clinic there are 3 colored patients. Correcting for this we find that, in our series, neurosyphilis actually occurred 3.8 times as often in the infected white as in the infected colored patient. This is in agreement with the generally accepted incidence figures for central nervous system involvement in the two races (Moore). A further survey of *Chart II* reveals the relative infrequency of neurosyphilis in the female, the racial difference again being apparent.

A study of *Chart IV* shows that, exclusive of one case of encephalitis, a history of primary or secondary syphilis occurred most commonly in the neurorecurrences, meningitis, and cranial nerve groups, a fact probably dependent upon the duration of the syphilitic infection. While a history of acute syphilis was obtained in 52.2 per cent of the series, there was a history of positive blood Wassermann in but 36.7 per cent. The former is essentially the same as reported by Lind, but contrary to Frothingham's studies in which a history of positive serological findings occurred more frequently than a history of primary or secondary manifestations. A history of some evidence of syphilis in the marital partner was obtained in 25.6 per cent. It is signifi-

Chart V

SEROLOGY

Type	No. Cases	Per Cent Pos. WaR	Per Cent Pos. Sp. Fl.
Tabes dorsalis	72	58.3	86.4
Tabo-paresis	18	73.3	94.4
Paresis	58	75.8	96.1
Vascular	27	66.6	88.4
Paraplegia	5	80.	80.
Combined system	6	66.6	83.3
Asymptomatic	38	92.1	100.
Neurorecurrence	29	68.9	100.
Cranial nerve	41	82.8	82.6
Meningitis	12	100.	91.6
Epilepsy	5	80.	100.
Ant. poliomyelitis	2	100.	100.
Mesencephalitis	1	100.	100.
M-V unc'assified	21	76.6	84.2
Total	335	74.3	92.

Chart VI

INCIDENCE RELATIVE AGE GROUPS, BY DECADES

Type	No. Cases	I	II	III	IV	V	VI	VII	VIII
Tabes dorsalis	72			2.7	26.3	30.5	27.7	9.7	2.7
Tabo-paresis	18	5.5			16.6	50.	27.7		
Paresis	58	3.4	1.7	10.3	29.3	31.	20.6	1.7	
Vascular	27			18.5	37.	25.9	11.1	3.2	
Paraplegia	5	20.		40.		20.	20.		
Combined system	6		16.6	16.6	16.6	16.6	33.3		
Asymptomatic	38	5.2	2.8	42.1	28.9	15.5	7.8	2.8	
Neurorecurrence	29		13.6	62.	17.4	6.9			
Cranial nerve	41		4.8	24.4	26.8	26.8	9.7	7.3	
Meningitis	12			50.	16.6		33.3		
Epilepsy	5			40.	60.				
Ant. poliomyelitis	2				50.			50.	
Mesencephalitis	1				100.				
M-V unclassified	21	14.2		28.5	33.3	28.5	18.5		
Total	335	2.6	2.6	22.	27.1	24.1	17.5	4.2	.5

cant that 42.6 per cent of the cases had received antiluetic treatment prior to their admission to the Syphilis Clinic. In almost every incidence this treatment was grossly inadequate, in the light of generally accepted standards.

The Wassermann reaction (*Chart V*) with blood serum was positive in 74.3 per cent of the whole series, while abnormal cerebrospinal fluids (classified after the method used by Moore) were present in 92 per cent of all cases examined. As was to be expected, the spinal fluid was abnormal in all cases diagnosed neurorecurrence and asymptomatic neurosyphilis. The occurrence of a positive blood Wassermann in only 74.3 per cent of our paretics is explained by the fact that many had received antiluetic treatment prior to admission to our Clinic.

The age at which neurosyphilis becomes clinically manifest is indicated in *Chart VI*. Our findings closely parallel those of Nonne (quoted by Tilney). The low incidence of neurosyphilis during the first two decades of life is evident, while the highest incidence occurred between the third to fifth decades.

Quite comparable to Schoenberg's statement that approximately 40 per cent of all neurosyphilitics have some type of cranial nerve involvement is the finding in our series that some type of cranial nerve affection occurred in 31.6 per cent of the cases (*Chart VII*). Affections of the optic nerve occurred in 13.7 per cent of the cases and were equally divided between atrophy

Chart VII

INVOLVEMENT OF CRANIAL NERVES

Type	No. Cases	II	III	V	VI	VII	VIII	XII
Tabes dorsalis	72	12.5			3.	1.3	4.1	
Tabo-paresis	18	11.1				5.5	16.6	5.5
Paresis	58	8.6		1.7	6.8	1.7		1.7
Vascular	27	3.7		3.7	3.7	14.8		3.7
Paraplegia	5							
Combined system	6	16.6						
Asymptomatic	38	2.6						
Neurorecurrence	29	6.9	10.3		13.7	17.2	6.9	
Cranial nerve	41	43.9	2.4		7.3	26.4	39.	
Meningitis	12	33.3				8.3		
Epilepsy	5	40.						
Ant. poliomyelitis	2	50.						
Mesencephalitis	1							
M-V unclassified	21	4.5						
Total (31.6)	335	13.7	1.5	.2	3.2	8.1 6.5	7.4	.8

No involvement of I, IV, IX, X and XI cranial nerves.

Chart VIII-A

SYMPTOMATOLOGY

Type	No. Cases	Headache	Diplopia	Failure of Vision	Loss of Hearing	Tinnitus	Vertigo	Speech Dist.	Loss of Consciousness	Convulsions	G. I. Symptoms	Crisis (gastric)
Tabes dorsalis	72	15.2	4.1	12.3	5.5	1.2	12.3	1.2	1.2	2.5	2.5	4.1
Tabo-paresis	18	11.1				5.5	33.3	16.6	11.1		16.6	5.5
Paresis	58	17.2	1.7	5.1	3.4		5.1	18.9	10.3	15.6	8.6	
Vascular	27	25.9	3.6	3.6	3.6		14.9	7.2	11.1	3.6	3.6	
Paraplegia	5											
Combined system	6	50.		16.6	16.6						16.6	
Asymptomatic	38	21.		2.6	2.6		2.6	2.6	2.6		18.6	
Neurorecurrence	29	65.5	17.6	10.3	10.3	7.1	34.8		17.4	13.7	10.3	
Cranial nerve	41	28.8	12.1	31.2	26.3	7.3	7.3	2.4		2.4	9.7	2.4
Meningitis	12	66.6		8.3	8.3		16.6	8.3	16.6	8.3	8.3	
Epilepsy	5	40.							40.	100.		
Ant. poliomyelitis	2											
Mesencephalitis	1			100.								
M-V unclassified	21	42.9	4.8			4.8	28.6		4.8	4.8	23.8	
Total	335	27.9	4.8	9.8	7.1	2.4	13.	6.	6.5	6.8	9.5	1.2

and retinitis. It is noteworthy, as was emphasized by Moore in a recent monograph on this subject, that optic atrophy occurred almost exclusively in the tabetic and "cranial nerve" cases, with an incidence of 12.5 per cent among the former.

The other cranial nerves most frequently involved were the eighth (7.4 per cent) and the seventh (6.5 per cent, exclusive of the supranuclear paralyses associated with hemiplegias). Among the 25 patients showing eighth nerve disease, there were 10 instances of bilateral involvement. There were two cases of facial diplegia among the 23 cases with a seventh nerve involvement.

An analysis of the symptoms and findings on neurological examination is made in *Charts VII* and *VIII*. These charts require but brief comment and only the most pertinent features of them will be discussed.

An examination of *Charts VIII-A* and *VIII-B* reveals the protean nature of the symptomatology of neurosyphilis. One is impressed with the high incidence of complaints of a serious nature. Excluding headache, which is the most common single symptom, there are relatively few specific complaints that do not suggest serious underlying disorder. Generally they conform to the usually expected type and frequency. Nevertheless, it should be noted that 28.4 per cent of the patients complained of nervousness and other vague symptoms.

Among the objective findings encountered (*Charts IX-A* and *IX-B*) we find pupillary changes in 58 per cent of the cases. Approximately one-half of these showed the typical Argyll-Robertson type of pupil which in our cases occurred predominantly in the parenchymatous groups. The remainder showed pupillary changes of the minor type. Other objective findings frequently observed (excluding the cranial nerve manifestations already referred to) include sensory changes (19.3 per cent), disturbances in coordination (Rhomberg's sign and ataxia, 31.3 per cent), disturbances in mental status (22.2 per cent), and alteration of the deep reflexes.

The evidence of cerebral vascular disease (monoplegia and hemiplegia) in approximately 10 per cent of our cases emphasizes the importance of syphilis as an etiologic factor in vascular accidents.

In assembling the above data we have found that 18, or 5.4 per cent, of the cases also had various tertiary types of syphilis. Of these, 8 had cardiovascular syphilis, 7 (including 6 with

Chart VIII-B

SYMPTOMATOLOGY

Type	No. Cases	Lightning Pains	Weakness and Stiffness	Tremor or Twitching	Paralysis	Ataxia	Sphincter Disturbance	Mental	Impotence	Paresthesia and Anesthesia	Nervous and Miscellaneous
Tabes dorsalis	72	47.3	16.7	1.2	4.1	47.3	29.1	1.2	2.5	37.5	7.
Tabo-paresis	18	37.2	42.7		16.6	22.2	5.5	55.	27.7	33.3	37.2
Paresis	58	5.1	12.1	11.9	12.1	12.1	15.6	67.2	4.3	4.7	43.1
Vascular	27	7.2	14.7	11.1	70.3		3.6			19.9	33.3
Paraplegia	5	20.			60.		40.			40.	20.
Combined system	6	66.2			83.3	16.6	50.			66.6	33.3
Asymptomatic	38		10.6							2.6	47.3
Neurorecurrence	29		3.4		17.4		6.8			13.7	20.7
Cranial nerve	41	2.4			19.6	4.8	2.4		4.8	4.8	19.6
Meningitis	12				25.			16.6		8.3	58.3
Epilepsy	5										40.
Ant. poliomyelitis	2	100.	50.	50.	50.						50.
Mesencephalitis	1						100.			100.	
M-V unclassified	21	14.2	9.6		9.6	9.6		4.6		19.	23.8
Total	335	17.5	12.7	3.	17.5	14.6	12.2	15.8	3.4	17.5	28.4

Chart IX-A

PHYSICAL FINDINGS

Type	Minor Pupil Changes	A-R Pupil	Optic Atrophy	Optic Neuritis	Cranial Nerve	Hemiplegia	Paraplegia	Superficial Sensory Disturbance	Deep Sensory Disturbance	Rhomberg	Ataxia	Muscular Rigidity
Tabes dorsalis (72)	27.7	52.7	12.5		8.3	1.4		27.2	33.3	54.1	48.6	1.4
Tabo-paresis (18)	38.8	50.	5.5	5.5	27.7	5.5		5.5	5.5	38.8	22.2	
Paresis (58)	18.9	33.3	1.7	7.	14.				1.7	14.	7.	7.
Vascular (27)	18.5	7.4		3.7	18.5	81.1				3.7	7.4	73.8
Paraplegia (5)	20.	40.					100.	40.				80.
Combined system (6)	16.6	33.3	16.6		16.6		50.	66.6	50.	50.	50.	16.6
Asymptomatic (38)	21.	5.2			2.5	2.5		2.5				
Neurorecurrence (29)	10.3			10.6	34.4	6.8		6.8	3.4	3.4		3.4
Cranial nerve (41)	19.5	14.6	29.2	14.6	100.					4.8	4.8	
Meningitis (12)	16.6	8.3		33.3	8.3			8.3		8.3		
Epilepsy (5)	20.											
Ant. poliomyelitis (2)				50.	50.		50.				50.	
Mesencephalitis (1)												100.
M-V unclassified (21)	28.6	14.3						14.3	4.8	9.6		
Total (335)	24.4	23.6	7.1	6.8	23.6	8.	2.6	10.1	9.2	16.1	15.2	8.

Chart IX-B

PHYSICAL FINDINGS

Type	Tremor	Speech Defect	Incontinence	Reflexes Generally	K. J.	A. J.	Babinski	Meningeal Signs	Charcot Joints	Minor Mental	Mental	Unconsciousness
Tabes dorsalis (72)	1.4		2.8	12.5	86.1	77.7	7.		8.4		1.4	
Tabo-paresis (18)	16.6	27.7		22.2	77.7	66.6	5.5			22.2	38.8	
Paresis (58)	29.3	32.7	7.	50.	7.	5.1	3.4	1.7		18.9	70.6	5.1
Vascular (27)	7.4	3.7		7.4			14.8				11.1	7.4
Paraplegia (5)					80.	80.	80.					
Combined system (6)			33.3	16.6	66.6		33.3					
Asymptomatic (38)				31.6	10.4	5.2	2.5			5.2		
Neurorecurrence (29)	3.4		3.4	24.1	13.8	3.4		3.4		3.4	6.8	
Cranial nerve (41)				17.1	14.6	14.6				7.3		
Meningitis (12)				16.6	33.3	8.3				8.3	25.	8.3
Epilepsy (5)				20.								
Ant. poliomyelitis (2)				50.	50.	50.						
Mesencephalitis (1)		100.		100.								
M-V unclassified (21)	4.8	4.8		47.6		4.8				9.8	4.8	
Total (335)	7.2	8.	2.6	25.9	32.2	25.9	5.6	1.2	1.8	7.9	17.3	1.8

Monoplegia, muscular atrophy, hypotonus, abnormal biceps, abdominal and cremasteric reflexes occurred in a small percentage of the cases.

Charcot joints) had bone syphilis, 2 had tertiary lesions of the skin, and 1 had gumma of the liver. This is a lower incidence of associated tertiary syphilis than previously reported by Hopkins and others, and no doubt our incidence figure would be much higher had special investigation been directed with this in view.

SUMMARY AND CONCLUSIONS

During the past seven years 335 patients with unquestionable neurosyphilis have been observed in the Syphilis Clinic of the Vanderbilt University Hospital. The records of these cases have been subjected to analysis. Our findings are summarized as follows:

(1) The incidence of neurosyphilis among patients with syphilis, at this Syphilis Clinic, was 6.8 per cent. Forty-three and eight-tenths per cent of the cases belonged to the parenchymatous group and the remainder were classified as meningovascular. Had routine lumbar puncture been performed on every patient coming to this Clinic, the incidence figure would probably have been much higher because of an increase in the incidence figure for asymptomatic neurosyphilis.

(2) The syphilitic white is 3.8 times as prone to develop neurosyphilis as the syphilitic negro. The colored female is relatively immune to syphilis of the nervous system.

(3) Neurosyphilis is manifest most frequently between the ages of 20 and 50 years. The greatest number of cases for any decade occurred between the ages of 30 and 40 in this study.

(4) A history of primary or secondary syphilitic lesions was present in 52.2 per cent of the cases. A history of previous antiluetic treatment (42.6 per cent) and previously positive blood Wassermann reactions (36.7 per cent) were next in importance, as evidence pointing to previous syphilitic infection.

(5) Central nervous system syphilis frequently involves the cranial nerves. This occurred in 31.6 per cent of our cases and was frequently a bilateral manifestation. The nerves most frequently involved were the optic (13.7 per cent), the auditory (7.4 per cent), and the facial (6.5 per cent). Optic nerve involvement was about evenly divided between atrophy and neuroretinitis. Optic atrophy occurred in 12.5 per cent of the patients with tabes dorsalis.

(6) Headache was the most frequently encountered symptom and pupillary disturbance the most frequently encountered sign of neurosyphilis. Generally, the symptomatology of neurosyphilis is varied and protean in nature, but suggestive of serious underlying disease. Nevertheless, the so-called "neurotic" complaints, as well as vague gastro-intestinal symptoms, "minor" pupillary changes, and precocious cerebral vascular accidents, especially in a known luetic, should cause neurosyphilis to be suspected.

(7) Seventy-four and three-tenths per cent of the cases showed a positive blood Wassermann, while 92 per cent showed abnormal ("positive") findings on cerebrospinal fluid examination. The cerebrospinal fluid was positive in 100 per cent of the asymptomatic and neurorecurrent cases. The low percentage of positive blood Wassermann reactions encountered in the paretic group was probably due to previous antiluetic treatment.

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CIRSOID ANEURYSM OF THE SCALP*

By PAT FITE, M.D., F.A.C.S.,
Muskogee, Okla.

From time to time there appear reports in the medical literature of the successful treatment of advanced cases of cirsoid aneurysm of the scalp. The condition appearing as it does superficially, almost entirely in the scalp, occasionally in the extremities, as a rule on the hands and feet, is easy of diagnosis, but sometimes difficult or impossible of operative cure. Within recent years arteriovenous fistula has been generally accepted as a generic name for

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all direct connections between arteries and veins, cirsoid aneurysm being one type.

The first case of arteriovenous fistula of record was described by William Hunter in 1757 and the term cirsoid aneurysm (varix-like) was given to the condition by Brecht in 1833. At various periods there has been renewed interest in these circulatory conditions, but very little progress was made until the work of Matas. Branham, in 1890, called attention to the fact that often pressure over the fistula produced a slowing of the pulse rate and this became known as Branham's bradycardiac sign.

The work of Royle and Hunter on the sympathetic nervous system in 1924 and that of LaRiche in 1917, although not dealing directly with circulatory conditions, led to the present studies in circulatory diseases in the extremities, and indirectly aroused renewed interest in arteriovenous fistula as a corollary because this can be one of the abnormal circulatory conditions occurring in the extremities. The very excellent writings of Rienhoff in 1924 and of Reid in 1925 also drew attention to this condition. Since that time several very comprehensive discussions of arteriovenous fistula, both congenital and acquired, have occurred in the literature.

Congenital arteriovenous fistula apparently can occur in any of the usual forms of blood vessel tumors occurring in the scalp, such as nevi telangiectasis, and apparently often at the site of injuries or contusions. Rich as the scalp is in circulation it is remarkable that more do not occur, sustaining as many injuries as it does. Practically all of these put in their appearance after fifteen years of age, the great majority in adult life. Because of the relative infrequency of the condition elsewhere in the body, there must be some inherent quality in the circulatory arrangement of the scalp that lends itself to the development of such an aneurysm. Progress of the tumor is usually slow, extending as a rule over a period of years. The veins and arteries both become involved, often the capillaries. Large tortuous venous spaces appear and progress proximally and there is also a retrograde dilatation and concomitant elongation of the arteries. The superficial temporal, posterior auricular and occipital arteries are most often primarily involved, but in extensive cases there is a corresponding involvement of all the chief arterial supply to the scalp, major dilatation, however, lying principally on the side on which the original tumor occurred. Rare cases have been reported in which there is an anastomosis between the vessels of the scalp and of the meninges. The condition is seen occasionally in the intracranial vessels. It is a significant observation that a high percentage of congenital arteriovenous fistulae occur about the head and neck, rarely elsewhere. This is explained on embryological grounds. It has been shown that in development of the vascular system there are frequently direct connections between the arteries and veins, especially in this region, and in cases that have been worked out, of unquestionably embryological origin, almost all show multiple intercommunications. This is seldom true of the unquestioned traumatic type, as they usually occur between large vessels and are more common in the extremities than about the head and neck.

The occasion of this discussion is the case of an arteriovenous fistula of the cirsoid type in a man age 31, first seen by me in July, 1925. He gave a history of having sustained a trivial wound in the early part of 1919 in the right occipito-parietal region. In February of 1919 he noticed a small tumor forming on the back of his head which gradually increased in size and pulsated noticeably when he was excited or under exertion. All this occurred while in the military service. He was discharged on this account from the military service on a surgeon's certificate of disability on September 12, 1919. In September and November, 1921, he was operated upon elsewhere unsuccessfully. No improvement resulted from these operations. An ulceration developed on the surface of the aneurysm in the spring of 1922 and was present continuously after that time. At various times after the appearance of the ulcerative area, there was oozing, and because of fear of an impending hemorrhage he was hospitalized as a total disability. When I first saw him, there was an aneurysm over the left occipital and left parietal region of the scalp, irregular in shape and about four inches in diameter, pulsating over the entire area with marked dilatation of the arteries and veins lateral to this area, markedly involving both occipital arteries, the right posterior auricular artery and the right superficial temporal artery. The supra-orbitals and the left temporal and posterior auricular arteries were involved to some extent. Over the central portion of the tumor mass there was a shallow ulcerating area with irregular, raised, sharply defined borders with a hot red base. The whole mass was considerably warmer than the surrounding skin temperature. Below and to the left of the aneurysm was a curved postoperative scar about six inches in length, evidently the site of the old operation. There were also small scars at the base of the skull over the right superior temporal, right posterior anterior and both occipital arteries, the site of the previous ligations. He was admitted to the hospital on July 8, 1925, with a diagnosis of cirsoid aneurism of the scalp. He was operated upon July 16, 1925, by me under novocain anesthesia, at which time all palpable arteries leading into the scalp were ligated. Following this there was a marked diminution of pulsation of the tumor and the vessels leading to and from it. On August 18, 1925, an attempt was made at dissection of the aneurysmal mass. Many arteries and veins were

ligated under the dissected flap. The whole operative field was surrounded by counter pressure pins applied at three points to control hemorrhage. There was considerable hemorrhage and great difficulty on account of the superficiality and tortuosity and frequency of the small vessels in the scalp. Because of the hemorrhage involved, the flaps were sutured back into position and the wound allowed to heal. On October 7, 1925, another similar and unsuccessful attempt was made. It was evident that for a cure of the condition approximately one-half of the scalp would have to be raised with a tremendous amount of ligation and considerable hemorrhage. Not wishing to go ahead with the undertaking before trying some simpler method it was decided to do a series of boiling water injections into the involved areas. Consequently a series of rectangular areas were laid out over the entire aneurysmal mass, each approximately 2½ by 1½ inches. On January 12, 1926, the first of these injections was carried out, the first rectangle being laid out over the region of maximum pulsation and in the neighborhood of the area indicated by the patient as the site of the beginning of the tumor. Hemostasis was applied to the rectangle by passing 22 gauge 4 inch needles under the scalp down to the pericranium and out again through the skin at a point 2½ inches distant. Another needle was laid on the skin and the two fastened together at the point of entrance and emergence of the first needle through the skin, thus applying pressure to the whole thickness of the scalp between the two needles. In this way a satisfactory hemostasis was produced within the rectangle thus laid out and the blood within the rectangle expressed by pressure. Boiling water was then injected into this area, the needle being introduced at one end and passed to the opposite end of the rectangle, at which point injection was begun and as fast as the overlying skin became blanched, the needle was gradually withdrawn. About 15 to 25 c.c. of boiling water were injected within each area. The injection was carried out under a local field block and was associated with very little discomfort, the patient complaining only of a slight aching. He was injected again on March 2, 192[illegible] May 20, 1926 and June 21, 1927. He was seen on January 16, 1930, at which time all evidence of the aneurysm had disappeared and none of the changes in the arteries of the scalp seen at the first examination had reappeared. The only abnormality was some slight scarring in the hair in the right occipitoparietal region which is not evident except on parting of the hair. Following the first injection all pulsation in the tumor mass disappeared and the venous spaces were collapsed, showing that the fistula had been destroyed at this injection. Following each injection there was moderate erythema and edema over the injected area which subsided in a few days. This same reaction followed each injection. There was no sloughing at any time. The patient was ambulatory throughout. The ulcer promptly healed following the first injection. The subsequent injections were carried out in order to do away with the non-pulsating venous spaces not destroyed at the first operation. These later injections probably might well have been dispensed with but because of the compensability of this case it was thought best to destroy all vestiges of the tumor.

COMMENT

Different forms of treatment have been used with varying success in cirsoid aneurysm. These vary from direct attacks on the tumor itself to ligations of the common carotid. Most of those reporting advanced cases in recent years have resorted to the raising of large flaps after the ligation of the external carotids or the vessels entering the scalp around the base of the skull. These procedures were rather formidable, and often associated with a fair amount of hemorrhage and sloughing. The treatment of this condition with boiling water is not new. J. A. Wyeth reported the cure of a case by injection along the vessels in 1901. Judd, commenting on this in 1916, did not consider it good treatment. We present it at this time because it proved to be a simple and effective treatment in the case in question.

The writer has had 3 cases of arteriovenous fistula of the scalp. The other 2, both in adults, with questionable traumatic origin, and less extensive, were cured by operative procedures within a circular hemostatic suture. Except that the operation was a bit tedious, no particular difficulty presented itself and permanent cures resulted. It is worthy of note that in none of these cases was there any evidence of systemic circulatory involvement nor has this been noted in the review of the reported cases of cirsoid aneurysm of the scalp. The fact that this is not a prominent feature in this form of arteriovenous fistula indicated that it is evidently a question of degree. The writer had occasion to observe a traumatic arteriovenous fistula between the femoral artery and vein in Scarpa's triangle May 20, 1927, in which a man 33 years of age sustained a puncture wound in the upper right thigh from a piece of flying steel in driving a spike.

He had an immediate hemorrhage which suddenly stopped after a few gushes. When seen within three hours of his injury, he had a moderate hematoma over the right Scarpa's triangle and a well developed arteriovenous fistula with a characteristic bruit. He was hospitalized for thirty-one days, after which time he was allowed to pursue his usual activities in a limited way about the farm and was observed repeatedly for a period of two months, during which time the condition of his circulation was watched. He developed a typical bradycardiac phenomenon and there gradually ensued a circulatory breakdown characterized by slight elevation of the pulse, increase in pulse pressure and questionable enlargement of the heart, dyspnea on exertion and a sensation of throbbing in his neck. He was operated upon September 1, 1927, at which time there was ligation of a segment of both the femoral artery and vein in Scarpa's triangle and also of the profunda artery and vein as the fistula appeared immediately over the opening of the profunda artery and with an amount of destruction making it impossible to do a satisfactory repair of the vessels in continuity. Immediately following the placing of the clamps on the vessels he stated that the throbbing in

his neck had stopped and he was relieved of his subjective symptoms. The dorsalis pedis artery in his right foot was palpable the next day and aside from some aching of the right foot immediately following the operation there was no evidence of insufficiency in the circulation following the ligation of the vessels. Within a few months he returned to work as a laborer on a farm in his usual capacity.

This case is cited for two reasons: first, to show that the development of the systemic reaction is due to the percentage of arterial blood escaping into the venous circulation directly through the fistula; and second, to again draw attention to the fact as pointed out by Reid in his articles of 1925 that in ligating the larger vessels of an extremity the accompanying veins should also be ligated. Otherwise the blood will shunt back too quickly into the venous system and not reach the further portions of the extremity, which may result in gangrene.

Pemberton and Saint, in a discussion of congenital arteriovenous communications in 1928, reviewed the etiological factors both in the production of the local and systemic changes It is easy to understand why the interposition of an arteriovenous fistula in a certain location in the scalp should lead to gangrene or ulceration both by doing away with a considerable amount of capillary exchange in its immediate proximity and by the back pressure on the capillaries due to the increased pressure on the venous side of the fistula. It is also easy to understand why there should be dilatation of the veins in that immediate neighborhood, as they are not constructed to withstand the increased pressure thrown upon them, but what is difficult of explanation is the dilatation of the artery proximal to the fistula. Various theories have been brought forward to explain it. It is suggested that due to the handling of the increased volume of blood there is a compensating thinning and elongation of the vessels. Reid says that "It would be unusual if a simple handling of an increased volume of blood by the proximal vessels did not lead to an hypertrophy and strengthening of their walls," rather than the thinning out that is seen. Then, too, this change is never general. Pemberton believes that in the first place the dilatation is acute and that following the dilatation there is a consequent constriction of the vaso vasorum, resulting in diminished nutrition of the vessel walls with consequent thinning and degeneration. From my personal observations that would more nearly fit in with the symptom complex observed. It is evident that the changes observed are the direct result of the change in the local circulatory dynamics, that an infection plays no part, and that all changes must be explained directly as a result of the deranged local circulatory physiology. The changes in the arteries are apparently reversible if the observations in the case above reported are correct. This applies chiefly to the arteries. The same reversibility is not obtained in the veins to a like extent as the large venous spaces remained, although they were smaller and not pulsating.

As to the systemic changes seen in arteriovenous fistula between the larger vessels, the explanation is somewhat different. With the elimination of a certain portion of elastic recoil of the arterioles, the fall in diastolic pressure is easily understood, as there is little if any rise in the systolic pressure. There is no agreement as to just why the cardiac enlargement should supervene. In some quarters it is held that this is due to the degenerative conditions brought about in the myocardium following upon incomplete filling of the coronary vessels because of low diastolic pressure. It is fairly well proven that there is an increase in blood volume. Others think that the increase in the heart size results from the handling on both sides of the heart of the increased volume, since the cardiac enlargement is not confined to the left side of the heart as an aortic insufficiency. The pulse rate follows Marey's law: that the pulse rate varies inversely as the blood pressure. The work of Anrep and Starling seems to show that this change in rate is brought about through the effect of the blood pressure upon the cardio-inhibitory center in the brain which reaches the heart by way of the vagus nerve. It is remarkable how quickly, following the closure of one of these large fistulae, the normal circulatory equilibrium is established. There seems to be very little relationship between the state of the heart and the operability of the case.

CONCLUSIONS

(1) Injections of boiling water may be used successfully to treat certain advanced cirsoid aneurysms of the scalp.

(2) Destruction of the fistula itself leads to a practical cure, with reversal of the local arterial changes and to some extent of those in the veins.

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DISCUSSION (*Abstract*)

Dr. Rudolph Matas, New Orleans, La.—The treatment of cirsoid aneurysm is too large a subject, when regarded in all its phases, to permit systematic discussion in the limited time allowed for this purpose. Every case of long standing involving large areas of the scalp is a problem which challenges the best thought and most varied resources of surgery. Some cases are beyond the curative power of surgery. Others are successfully dealt with by bloodless methods such as that described by Dr. Fite; others by combining the bloodless with the surgical methods. Some of the most remarkable cures that I have seen occurred spontaneously after trivial injuries which were followed by a generalized thrombo-phlebitis of the cirsoid plexuses leading to their total obliteration. Practically all the bloodless methods (coagulating or sclerosing injections, boiling water, caustics, radium, and so on) aim at the same results, namely: the obliteration of the vascular channels that constitute the racemose or cirsoid tumor. The prognosis as to cure, depends upon the extent and depth of the scalp involved and the age of the lesions. In the more extensive cases in which the scalp is permeated by an ampullar or cavernous network of anastomosing arteries and veins, surgery offers the best prospect of radical cure. Each case has to be treated according to its individual merits. As a contribution to this formidable type of vascular disease, I wish to report a recent experience in my practice.

C. G., a robust, healthy German-American, aged 27 years, was admitted to my service at the Touro Infirmary, on July 19, 1932. He gave the history that four years before admission, he and a friend were practicing with an elastic muscle exerciser. Each grasped a handle and pulled the rubber as far as it could stretch. The friend's end slipped and the handle struck the patient in the left parotid and temporal regions, knocking him down and stunning him for a moment. A swelling and several skin scratches immediately appeared over the contused area, which at first subsided, but two weeks later became more prominent and throbbed continually. During the four years that followed this injury, the pulsating swelling in the pre-auricular region gradually spread by many palpable and visible ramifications forming a plexus of pulsating vessels which extended to the midline of the cranium above, from the forehead to the occipital region. When seen by Dr. Matas, the diagnosis of traumatic arteriovenous aneurysm (cirsoid) was fully established. An attempt to visualize the abnormal plexus in all its details was made on August 5, 1932, by injecting the most prominent ampullar swelling in the parotid region with Iopax, a dye used for intravenous pyelography. Hardly had 1 c. c. of the solution been injected, when the patient cried and almost collapsed from intense pain while an angiospasm converted the dilated vessels into hard, rigid, and pulseless cords. The suffering continued for nearly twenty minutes. When the spasm gradually relaxed, the dilated vessels began to pulsate again and the characteristic hum and murmur returned. The attempt at radio-angiography had to be abandoned but the radiographs showed distinct traces of the dye an hour after the injection.

The steps of the operation in this case were recorded as follows:

(1) Local infiltration of the lines of incision in the neck and pre-auricular regions. Novocain and epinephrine were injected with Labat and Dunn syrings.

(2) The common carotid was exposed at the bifurcation and the external carotid, above the superior thyroid and including this vessel (chromic catgut) ligated.

A provisional traction loop under the common carotid was placed below the bifurcation to control any possible communications with the intracranial circulation which might cause diploic hemorrhage in the course of the operation.

(3) Arrest of pulsation and collapse of the whole cirsoid plexus in the face and scalp followed this procedure.

(4) The incision made to expose the carotid in the neck was extended up behind the angle of the jaw, over the parotid and pre-auricular region to the zygoma.

(5) Widely dilated congeries of arteries and veins were exposed, dissected and excised between ligatures in the parotid region, down to the plane of the parotid gland itself. Branches of the transversalis, facial and temporal arteries and veins constituted this anomalous plexus. It was evident that the arteriovenous anastomoses were multiple and the separate and individual dissection and detachment of the arteriovenous fistulae was practically impossible. The veins formed large, coiled ampullar dilatations resembling a mass of turgid leeches. This plexus extended from the auricle behind, to the cheek in the premasseteric region in front, and from the angle of the jaw, below, to the zygoma above. The bulk of the plexus rested on the parotid fascia, but sent numerous communicating branches below it. In extirpating these large vessels, some fibers of the facial nerve were unavoidably injured, causing a slight deviation of the left angle of the mouth to the right.

(6) The head was encircled with an inch wide, heavy stationer's rubber band, made to constrict the entire cranium above the ears, eyebrows and occipital protuberance. This band acted as a tourniquet for the

purpose of controlling bleeding from the temporal, frontal and occipital anastomotic branches that came from below and from the opposite side of the head.

(7) After securing prophylactic hemostasis in this way, a free incision of the scalp was made from the glabella to the inion, the knife cutting through all structures to the periosteum with a downward curve towards the mastoid. Despite the prophylactic hemostatic band, there was free bleeding from a great many vessels in the right side of the scalp which were controlled quickly by using Vorschutz flat scalp hemostats. No bleeding occurred from the left (cirsoid) side. The whole scalp was lifted as a solid hemicranial flap from the midline of the skull to the supra-orbital arches in front, the upper occipital ridge and mastoid behind, with the temporal muscle and zygoma as a pedicle.

(8) Circulation in the flap was completely controlled by turning it over the face and ear and compressing the base or pedicle with a wet sterile towel. When the flap was turned down in this way, it covered the whole half of the face down to the lower jaw.

(9) Practically all the cirsoid vessels were contained within the flap, between the galea (occipito-frontalis aponeurosis) and the hairy integument. The vessels could be felt fairly well under the aponeurosis, though in a collapsed state, as they coursed through the thickness of the supra-aponeurotic planes. In order to make sure of completely controlling the circulation in these vessels, the aponeurosis was incised from the frontal to the occipital end of the flap. This exposed the dilated vessels, which looked like large, but collapsed veins, throughout the whole line of the incision. Many of the larger veins were excised and the entire plexus was controlled by a continued chain-ligature which was carried as a buried suture through the whole length and thickness of the flap from behind forwards. The plexus of deep dilated temporal vessels was also excised and ligated as the vessels emerged from under the zygoma.

(10) A series of through and through interrupted dermal transfixion sutures was now made to go through the base of the scalp flap and each tied separately over pads of gauze. These transfixion sutures were applied as ligatures to cut off all the vessels that might enter the hemicranial flap at its base from above the level of the zygoma.

(11) A few shallow venous channels were found coursing longitudinally through the periosteum of the denuded skull. They seemed to be entirely within the periosteum, and caused no indentation or groove in the bone, nor did they have any diploic communications, as had been feared before operation. These sinuses were simply laid open (about three of them) from one end to the other, and scrubbed with gauze in order to rub off the lining endothelium and thereby insure their total obliteration. None of these sinuses bled when opened, showing that all their vascular connections had been detached in the previous manipulations.

(12) Arriving at this stage considerable time was taken in securing a number of small vessels in the right side of the median scalp incision. About 35 or 40 fine gut ligatures were applied to control these, when the prophylactic Vorschutz scalp clamps were removed.

(13) No bleeding followed the removal of the heavy elastic constrictor after these vessels had been secured.

(14) The hemicranial scalp flap, now pulseless and without any bleeding from the collapsed vessels, was replaced and sutured by a series of interrupted dermals extending from the forehead to the occiput.

(15) The whole line of incision of the scalp, face and neck which had been previously painted with mercurochrome was again gone over with the same solution, a layer of paraffined gauze was placed over the suture line, and the wound was dressed with sterile gauze, held in place by a head bandage and more firmly bound down by adhesive strips. Over this, a plaster of Paris roll was carried over the head, face and neck as a helmet, in order to fix and immobilize the neck.

(16) Local anesthesia, preceded by nembutal and morphia, was quite efficient. Perfect anesthesia continued throughout the operative work in the carotid and parotid regions. Ethylene-oxygen mixture was used intermittently for the rest of the operation, after the heavy elastic constrictor had been applied to the head.

(17) The patient was on the operating table from 11 a. m. (including local anesthesia, other preliminary preparations and the application of plaster bandage) to 1:40 p. m.

He lost a considerable amount of blood after the hemostatic rubber band and Vorschutz clamps had been removed, chiefly from a number of small vessels which came from the opposite side of the scalp, at the median incision. Probably 170 c. c. in all were lost.

The patient at all times was very helpful and cooperative. He was sent back to his bed awake and in very fair condition.

The patient quickly rallied and made an uneventful recovery with the exception of a small skin slough in the anterior angle of the median incision, leaving a raw surface which completely healed by granulation. He was discharged October 5, 1932, 10 days after complete cicatrization had occurred.

[The appearance of the patient before and after the operation, and every step of the operation, was illustrated with lantern slides.]

The result was most satisfactory. No trace of the dilated cirsoid vessels which had been conspicuous before the operation could be seen or felt. The scars left by the incisions were also well disguised as they were placed within the line of the hairy scalp.

This case is interesting in many ways, but chiefly it illustrates the advantage of boldly attacking the cirsoid areas from the subaponeurotic surface of a whole scalp flap which is lifted from the pericranium and turned down over its base. This permits the simple obliteration of the main nutrient vessels by multiple ligation or a continued chain suture carried through the whole thickness of the flap at its base. In this case the anomalous vesse's had developed in the left half of the scalp and for this reason a complete hemicranial flap had to be lifted from the midline to the zygoma. When the cirsoid involves the whole scalp it is safer to attack one-half of the scalp first, and the other several weeks afterwards. I have resorted to this surgical scalping method in several other cases of the same type, and have found it to yield most satisfactory results. This, however, is the severest test to which I have put this procedure.*

*In a letter dated June 7, 1933, the patient confirms his complete recovery with scarcely any visible traces of the operation since the scalp has grown an abundant hair crop.

GIANT TUMOR OF THE BREAST: REPORT OF CASE*

By Wm. Francis Martin, M.D., F.A.C.S.,
Charlotte, N. C.

This case is reported because of the enormous size of the tumor and age of the patient, in a city and country where facilities for competent advice and surgery are adequate. The tumor exerted no influence on the general health, though it was present over a considerable time. There was absence of swelling of the axillary lymph nodes and absence of mammary tissue, ducts, and mitotic figures. The only discomfort was the weight of the breast, which was suspended in a sack from the opposite shoulder, and some pain which was experienced in damp weather.

In January, 1931, in *Annals of Surgery,* Drs. B. G. Lee and G. T. Pack,[1] of New York City, presented four case reports of giant intracanalicular myxoma of the breast and summarized the salient characteristics of this tumor. In the *American Journal of Cancer* in 1931 they[2] gave a summary of 105 case reports.

This case presents the characteristic features of a giant intracanalicular fibromyxoma of the breast as follows:

(1) Greatness in size.

(2) Lobulations and delimitations of the tumor.

(3) Encapsulation of the tumor and non-invasion of the breast.

(4) Mobility and non-adherence to the skin and fascia.

(5) No retraction of the nipple and no involvement of the axillary lymph nodes.

(6) Long initial periods of quiescence or slow growth followed by sudden rapid acceleration.

REPORT OF CASE

V. N., age 16, colored, single, complained of a tumor of the left breast.

She had had measles and pertussis; no other illness. At the age of 12 years the patient noticed a small lump in her left breast. There was no pain except during damp weather. She had never noticed secretion from either breast. There was no history of injury to the breast.

Her menses began at the age of 13 years, were regular, with no pain, normal in amount, with a duration of 4 days. There was no history of leucorrhea or miscarriage. The lump in the breast was not affected by menstruation.

*Received for publication July 5, 1933.

Four years before my examination, the patient noticed a small lump in the left breast, with no enlargement of the breast or lump until 2 years previously, when it began to grow rapidly to its present size.

Upon examination, the head and neck were normal. In the chest, the heart and lungs were normal. The left breast revealed a pendulous enlargement of possibly 45 pounds weight, roughly guessing. The right breast was normal in size; no tumors were felt. The abdomen was negative. The extremities were negative. Vaginal examination was omitted. Blood pressure was 110/70; urine negative, and Wassermann negative. There were 10,000 white blood cells, 4,500,000 red cells, and 85 per cent hemoglobin.

Detailed Examination of the Left Breast.—The entire left breast was the seat of a bulky, lobulated, freely movable, encapsulated, non-adherent, bosselated, nodulated tumor with variable regions of fluctuation and resistance, all easily felt through the skin and unaccompanied by retraction of the nipple or palpable axillary lymph nodes. Some portions were elastic, others knobby and firm. There was no skin adherence. Large superficial veins were noted on the anterior surface. There was no pain on manipulation. Actual measurements were: from above downward and around, 35 inches; width at widest point, 17½ inches; circumference at the top, 27½ inches; width at narrowest point, 10 inches; length from above downward, 18 inches (*Fig. 1*).

Fig. 1

Operation was undertaken October 7, 1932, at the Good Samaritan Hospital in Charlotte, North Carolina. Under ether anesthesia the breast and large tumor were removed. After making several incisions in the skin and running a clamp under it, I was able to join the incisions and remove the breast with the large tumor mass with little bleeding. The patient made an uneventful recovery and was discharged seven days after operation.

PATHOLOGICAL REPORT

(By L. C. Todd, M.D.)

The specimen is a breast tumor, weight 33.3 pounds. Grossly, it is an enormous lobulated, encapsulated mass, yellowish in color on cut sections and shows a diffuse translucency oozing a gelatinous fluid. The skin over it shows the nipple and areola stretched tightly and flattened. No mammary tissue is found. There are no cysts, ducts or hemorrhage in the tumor mass. The muscle is not infiltrated. The capsule is dense and intact.

Microscopically, blocks from five areas show the same type structure, a fibroma with diffuse myxomatous degeneration. Certain of the lipoid areas show complete replacement of the former adipose tissue by this type of growth. No ducts or epithelial structures are seen.

Diagnosis.—This is a giant lipo-fibro-myxoma of the left breast.

COMMENT

This case being a giant lipo-fibro-myxoma of the breast, the location is not a common one. As a rule they are found in the retroperitoneal spaces and in this region seem to reach their maximum size. There is a report of one weighing 65 pounds. They also occur in the anterior surfaces of the thighs and umbilical region, with wide variations in size. Dr. H. E. Robertson[3] estimates in a series of cases of lipoma myxomatodes 17 tumors (33 1/3 per cent) which were regarded as frankly malignant; 23 (44 plus per cent) were tentatively regarded as benign.

From the characteristic pathology, it appeared to be benign. This case, in my opinion, was one of giant lipo-fibro-myxoma. There is a question in my mind as to the cause of the absence of mammary tissue. Was it due to the fact that this tumor mass began just before puberty, causing an absence of mammary tissue, or was the absence due to "pressure atrophy," the mass being situated behind the breast proper? I am inclined to believe the latter to be the case.

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3. Robertson, H. E.: Lipoma Myxomatodes. Jour. Med. Research, 35:131-146, Sept., 1916.

604-8 Professional Bldg.

ECTOPIC PREGNANCY WITH A SIMULTANEOUS INTRA-UTERINE TWIN PREGNANCY*

By LINTON SMITH, M.D.,
Atlanta, Ga.

L. M., colored, age 21, a multipara, had menstruated first at twelve. Her periods were regular. She had never been pregnant. She had the usual diseases of childhood, no serious illnesses, but symptoms of syphilis. Her past history otherwise was essentially negative.

At the time of examination she had not menstruated in four months, and had been treated at the municipal hospital with a diagnosis of pregnancy. She had a profuse creamy vaginal discharge, burning on urination, healed bartholinitis scars, nausea and vomiting for the previous month. Forty-eight hours before I saw her she was seized with a sharp lancinating pain in the lower left abdominal quadrant. She became faint and nauseated; her temperature was 99°, pulse 122. There was a very scant vaginal discharge which was blood-tinged, and recurrences at intervals of the sharp cutting pain. Abdominal examination revealed a mass in the lower mid-abdomen with rigidity over the entire left lower quadrant. A vaginal examination disclosed a pregnant uterus which in size corresponded with a four months pregnancy; the tubes and ovaries were not palpated. She was immediately sent to a hospital with a tentative diagnosis of four months intra-uterine pregnancy, with a left ruptured ectopic pregnancy and hemorrhage and was prepared for immediate operation. There were no facilities for making a blood count.

Upon opening the abdomen through a low mid-line incision there was a rush of dark blood with a pregnant uterus presenting in the incision. A four months male fetus was found floating in the abdomen with the cord attached to the placenta which was still firmly adherent to the inside of the left ruptured tube. A left salpingectomy was done and the abdomen was closed. An uneventful recovery was made and the patient left the hospital in twelve days with the intra-uterine pregnancy uninterrupted.

Exactly one month after the operation without other ascertainable cause than syphilis, she aborted a male and a female fetus of about five months.

The interesting feature of this case was that three pregnancies evidently took place at one time; a male pregnancy in the left fallopian tube, and a twin pregnancy, male and female, within the uterus.

427 Moreland Avenue, N. E.

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Southern Medical Journal

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EUGENIA B. DABNEY, M.S., Assistant Editor
C. P. LORANZ, Secretary-Manager

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Twenty-Seventh Annual Meeting
RICHMOND, VIRGINIA, November 14-17, and a post-meeting day in Washington, D. C., November 18

THE RICHMOND MEETING

With summer gone, many vacations past, the weather a little cooler, it is time to plan the winter's work again. Medical and surgical methods are changing faster than ever before, and only by frequent comparison of one's own technic with that of professional brothers in other parts of the country can medical men keep up with the times.

Now, when the country is in an economic revolution, the interests of physicians are more closely knit than they have ever been before. Organized medicine needs the support of all its members, and its members need for their own sakes to strengthen their organizations.

The Richmond meeting in November will offer every opportunity for a delightful and profitable few days. Physicians and their families should make their reservations early.

CYCLIC CHANGES IN VAGINAL CELLS OF WOMEN

The great stimulus to the studies of the past decade upon the sex hormones came when Stockard and Papanicolaou devised their vaginal smear test, which indicates the stage of activity of the ovaries of a living animal. These distinguished anatomists, after prolonged studies of small rodents, showed that the cells of the vagina undergo a cyclic variation which may be correlated with the periodic formation of ovarian follicles, their rupture, and the development of corpora lutea. A definite histological picture in the vagina is characteristic of estrus or heat in the animal, and of ovulation, and another type of cell predominates in the resting period.

Using this work Allen and Doisy,[1] of the University of Missouri, tested the physiological activity of various ovarian extracts by injecting them into small animals and examining the vaginal smear for several days thereafter. They produced a crude ovarian preparation which regularly caused a change in the vaginal cells of immature small animals. The extract could be standardized and further concentrated by observation of its effect upon the vaginal cells.

Menstruation of women and estrus of animals are of course quite different phenomena, and it was for many years difficult to show a relationship between the several types of sex cycle within the mammalian species. "The lack of pronounced menstrual bleeding in the lower mammals and the absence of a typical heat period in the human female and primates has caused much confusion regarding attempted analogies of the species."[2] Many unsuccessful efforts have been made to determine the sex cycle of women by vaginal smears. From studies of the higher monkeys, and of women at operation, the ovulation time of women is now generally believed to occur at about the twelfth to thirteenth day after the beginning of menstruation.

Papanicolaou,[2] of Cornell, following extensive studies of human vaginal smears, has finally described a normal cyclic variation in these which is comparable to the changes in lower animals. He recognizes by histological study of the cells and depicts in excellent illustrations a menstrual phase, other stages in the monthly cycle, the onset of pregnancy, and parturition. Typical

1. Allen, Edgar; and Doisy, E. A.: An Ovarian Hormone. J.A.M.A., 81:819, 1923.

2. Papanicolaou, George N.: The Sexual Cycle in the Human Female as Revealed by Vaginal Smears. Amer. Jour. Anat., 52: 519, May 15, 1933.

changes in the vaginal smear characterize each of these uterine and ovarian changes.

Many clinical possibilities are suggested by his histologic studies. Daily vaginal smear examinations should be helpful in the diagnosis of endocrine disorders, for example particularly of menstrual disturbances and sterility. It is possible that leucorrhea, long a mystery and bugbear to the gynecologist, is related to an increased secretion of theelin. The vaginal picture in women which corresponds to the heat period of animals shows an exaggerated secretion of mucus, and theelin or estrin injections in animals increase the secretion of mucus. If the vaginal smear in leucorrhea shows a prolonged theelin phase, this possibility would become a probability.

Since a vaginal smear characteristic of pregnancy has been described, it is reasonable to believe that following further studies a vaginal smear test for pregnancy may be developed which will equal in value and exceed in convenience of execution the well known Aschheim-Zondek pregnancy tests. A pregnancy test which does not require the maintenance of a stock of laboratory animals is to be desired.

A recent paper[3] in *Surgery, Gynecology and Obstetrics* dealing with birth control brings up again the question of the existence of sterile periods during the menstrual cycle of women. This is an almost threadbare subject; the idea of infertile periods has been so much contradicted that it ranks close to the superstition regarding the effect of maternal impressions on the baby. Papanicolaou shows that although there is a characteristic cycle of women, there are numerous variations in normal individuals. The correlation of vaginal smear studies with statistics upon the time of conception or of infertility of women may further elucidate this subject and add to the knowledge of the existence of sterile intervals in the human female.

The description of a clinical normal, which Papanicolaou has apparently achieved, is the first requirement for study of variations in disease.

3. Miller, A. G.; Schulz, C. H.; and Anderson, D. W.: The Conception Period in Normal Adult Women. Surg., Gyn. & Obst., 56:1020, June, 1933.

GLEANINGS FROM RECENT JOURNALS

Cause of Diabetes.—Removal of the pancreas from geese, dogs and other animals results in prompt rise of the blood sugar with appearance of glucose in the urine. Insulin, which relieves the symptoms of human diabetes, is obtained from the islets of Langerhans of the pancreas. These two facts have seemed to enclose the etiology of human diabetes within a single organ, the pancreas; yet many years of search for changes pathognomonic of diabetes in the pancreases of persons who have died of the disease have produced no positive findings. Shields Warren[1] reports among 300 autopsies of diabetics, 69 with perfectly normal pancreases.

Cushing,[2] in 1912, produced evidence of the association of glycosuria with excessive secretion of the anterior pituitary lobe. Glycosuria is frequent in acromegaly. Three groups of investigators, working simultaneously and independently, have recently described the production of diabetes in dogs by a new experimental method. According to Evans,[3] of the Bureau of Dairy Industry, United States Department of Agriculture, Houssay was first to report it. Evans, in studying the effect upon dogs of lactation hormone obtained by various methods of extraction from the anterior pituitary gland, observed the development of a severe lipemia, or increase of blood fat, 24 to 48 hours after an injection. This alkaline extract was then given to a dozen dogs, the majority of which promptly showed lipemia, polydipsia, polyuria, hyperglycemia, on about the fifth day sugar in the urine, and subsequently acidosis. Two dogs went into diabetic coma, which was partly relieved by insulin. Evans refers to the substance which causes these symptoms as the diabetogenic hormone of the anterior pituitary. He has been unable to separate it from the lactation hormone. This work must remove the spotlight of attention from the pancreas to the anterior pituitary in diabetes.

The entire pituitary gland is very small and

1. Warren, Shields: The Pathology of Diabetes Mellitus. Philadelphia: Lea & Febiger, 1930.

2. Cushing, H.: The Pituitary Body and Its Disorders, 1912.

3. Evans, E. I.: Diabetogenic Principles of the Anterior Pituitary. Proc. Soc. Exper. Biol. & Med., 30:1370, June, 1933.

the pars anterior is but a fraction of the whole. This portion, however, has already attracted to itself in the eyes of physiologists an astonishing part of the responsibility for normal existence. Substances may now be extracted from it which in very small quantities (1) stimulate the growth of young animals; (2) cause the immature ovary to form follicles and ova; (3) cause the ovary to produce corpora lutea; (4) initiate and stimulate milk production; (5) stimulate development of male gonads; (6) induce rapid hyperplasia of the thyroid gland with increase of heart rate and exophthalmos; (7) cause lipemia, glycosuria and diabetes. The extracts would seem, therefore, to have a large number of possible clinical uses.

Dental Caries.—Decay of the teeth probably shares with the common cold the honor of being the commonest minor ailment of civilized countries. While it used to be considered a purely local manifestation, the result of inadequate cleansing of the teeth, modern investigation has tended more and more to show that caries is an indicator of a generalized disease. It may be induced experimentally by several dietary errors: lack of vitamins A, C, D and insufficiency of calcium and phosphorus particularly affect tooth structure. These same food deficiencies are well known to cause lesions elsewhere in the body.

Hubbell,[1] of Michigan, among others, has made a number of chemical studies of blood and saliva of children with and without holes in their teeth. A fairly elaborate series of blood determinations showed no differences for the two groups. In analyses of the saliva, the total ash, the calcium, phosphorus, chloride, diastatic activity (starch-splitting enzyme) and hydrogen ion concentration were not different. The carbon dioxide combining capacity of the saliva of the children with healthy teeth, however, was 44 per cent higher than that of the saliva of children with active caries; and the titrable alkalinity of the saliva of caries-free children was 24 per cent higher. This indicates greater susceptibility of the caries group to injury from acids, lessened ability to neutralize acids, though actually the saliva gave a no more acid reaction than the saliva of normals.

This evidence may be taken to favor a base-forming diet for prevention of tooth decay.

1. Hubbell, R. B.: Chemical Composition of Saliva and Blood Serum of Children in Relation to Dental Caries. Amer. Jour. Physiol., 105:436, Aug., 1933.

TWENTY-FIVE YEARS AGO

FROM MEDICAL JOURNALS OF 1908

Cancer of the Breast.—Dr. William D. Haggard[1] said: "All of the diagnostic signs of cancer that we learned as students are really its complications. We must relearn the importance of suspecting and microscopically proving the diagnosis in tumors of the breast no larger than peas. . . . Sampson Handley, of London, claims that the lymphatics are the routes of extension of this dreaded disease rather than the blood, as was formerly taught. . . . Some years ago we had sanguine hope of the wonderful x-ray. It has proved almost totally disappointing in the management of malignant disease. . . . It will contract the lymphatics and deposit fibrous tissue in and about the glands, which delays progress. . . . It is on the same principle that Dawbarn ligates the arterial supply to starve and thus delay malignancy."

Cause of Dental Caries.—Dr. Eugene S. Talbot[2] said: "The lessened degree of alkalinity of the blood or acid intoxication of the system causes contraction of the arterioles, lessening the blood supply and causing vasomotor neurosis and arteriosclerosis in end organs such as the pulp and alveolar processes. . . . In pregnancy faulty metabolism and acid intoxication are present. . . . The treatment consists in reducing the acidity of the urine to normal, 30 to 40 degrees. This is accomplished by giving the patient (an adult) from 10 to 30 grains of sodium bicarbonate or one-half teaspoonful (45 grains) of sodium chloride after meals or sodium phosphate one teaspoonful morning and evening."

1. Haggard, W. D.: The Factors which Influence the Permanence of Cure in Operations for Cancer of the Breast. J.A.M.A., 50:249, 1908.

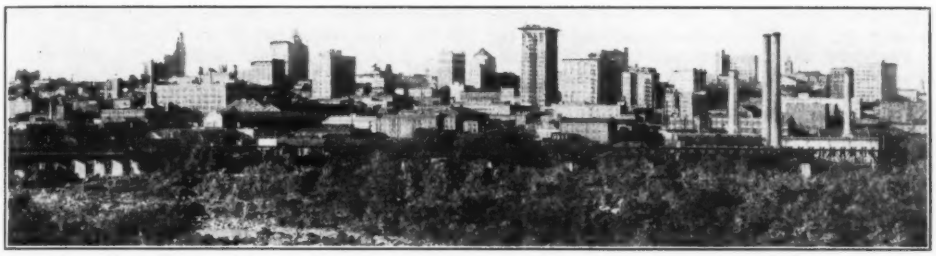
2. Talbot, E. S.: Cause of Dental Erosion. J.A.M.A., 50:196, 1908.

Richmond—Where We Meet

INTRODUCTION*

Out of its ancient past, rich in events of deep significance in the history of the nation, the city for the 1933 meeting of the Southern Medical Association emerges today an embodiment of the spirit of the New South. Though ever conscious of her traditional backgrounds and of her cultural assets linked with the earliest days, Richmond has approached her future with all the vigor and foresight of the most modern of Ameri-

*By Dr. Joseph F. Geisinger, Chairman of Sub-Committee on Publicity, General Committee on Arrangements from the Richmond Academy of Medicine, Richmond, Va.



Richmond's Growing Skyline.

can cities. The result is an engaging combination of past and present where, enveloped by an atmosphere that sweeps one back to the dawn of American history, one yet stands at the busy heart of a commercial, social and medical district of real note. Upon the ashes that marked her desolation in the tragic days of 1865 has been built a new and metropolitan structure that is the Richmond of today. Here and in the immediate tributary territory a quarter of a million people spend their lives. Great schools, hospitals, hotels, banks and industrial plants now lie spread in a wide area around the stone cross marking the spot where Captain John Smith stood in 1607 and planned a modest settlement for his colony of adventurers. Wide avenues, residential sections of great charm, notable monuments, complete the material picture of the Capital of the Old Dominion—a picture that will be vitalized by a warm and inviting hospitality, of which the physicians of the South and their guests will be speedily conscious when they assemble here in convention in November.

In previous articles Richmond of by-gone days has been described by distinguished gentlemen writing especially for this JOURNAL. It seems fitting now to have a glimpse of the city of this day and time. The President of the Richmond Chamber of Commerce, Mr. Wade H. Adams, gives us such a glimpse in the article which follows.

RICHMOND OF TODAY*

Richmond is the industrial, commercial and financial as well as the political capital of Virginia. Trade and commerce balanced by a deeply embedded cultural background have combined to make this possible, and throughout her long, and at times troubled history, the tangible evidence of the city's growth has served merely as the yardstick by which the indomitable courage of her citizens has been measured.

The beginning of the present capital dates back to 1607, when Captains John Smith and Christopher Newport with their band of adventurers set out to explore the James River. In search of gold, this party was doomed to disappointment. They were soon to find, however, that the wealth to be found in the cultivation of Virginia tobacco was to do more to hasten the development of the new land than all the precious ores mined from her sturdy mountains.

Richmond was incorporated as a town in 1742, became the capital of Virginia in 1779, and was incorporated as a city in 1782.

First the crude settlement, then the town, then the city in which commerce and industry began to play a significant role. The ships of the James soon found worthy competitors in the iron horse. Rails were flung out to unite a vast country. The city prospered.

Through all this development Richmond was moulding her character. Her sons went forth to serve with Washington during the Revolution, and hardly had the final echo of cannon been stilled at Yorktown before the city turned attention to the War of 1812.

The War Between the States found Richmond the goal of two great armies and the gallant but tragic story of the Confederacy was written on battlefields in the immediate vicinity of the city—battlefields that have been preserved by Richmond people and converted into an extensive park.

Battle Park.—At Cold Harbor and Malvern Hill, at Seven Pines and Gaines Mill, at Fort Harrison and in the mire of White Oak Swamp, the tide of the Southern cause reached its flood stage and its lowest ebb. There the genius of Robert E. Lee was first displayed; there "Stonewall" Jackson hurled his forces at invading armies, and there Southern soldiers from every State of the ill-fated Confederacy gave their lives for a cause they believed to be right.

The War left Richmond in ashes. Although the work of reconstruction started immediately thereafter, the paralyzing aftermath of disaster made progress slow.

How well Richmonders of the 1860's builded for the future is demonstrated in the fact that today the city is one of the wealthiest per capita in the United States. Here is located the seat of the Fifth Federal Reserve Bank. It is an educational and a medical center of importance. Fine homes stand on its wide avenues. More than 500,000 visitors are attracted here yearly by the historic shrines, the excellent golf courses and scenic attractions.

Tourists are learning that Richmond is their logical headquarters for sight-seeing trips through the State. Jamestown, where the first permanent English settlement was planted in 1607; Yorktown, where American independence became a reality; Williamsburg, the colo-

*By Wade H. Adams, President of the Richmond Chamber of Commerce, Richmond, Va.

nial capital of Virginia, now being restored by John D. Rockefeller, Jr., lie within a two hours' drive to the east; Petersburg and the excellently preserved battlefields are within a half hour's drive to the south; historic Fredericksburg is less than 60 miles to the north, and at Charlottesville the university founded by Thomas Jefferson is but 90 miles west.

Historic shrines located within Richmond proper are entirely too numerous to permit a full description in a limited space, but a few show places are:

The Virginia State Capitol—seat of the oldest representative law-making body in the New World. This building, designed by Thomas Jefferson, is one of the great historic structures of the State. It was here that Aaron Burr was tried, that General Lee was granted his commission as commander of the armed forces of Virginia and here the body of "Stonewall" Jackson lay in state. Housed within the State Capitol is the famous Houdon statue of Washington, one of the most valuable pieces of marble in America.

The John Marshall House, Ninth and Marshall Streets, which was purchased by Chief Justice Marshall in 1795 and occupied by him until 1835.

Valentine Museum, Eleventh and Clay Streets, with its original of Lee and its wide collection of paintings, prints and statuary.

The White House of the Confederacy, Twelfth and Clay Streets, occupied by President Jefferson Davis during the trying years of the War Between the States.

Battle Abbey, or Confederate Memorial Institute, North Boulevard, housing the John Barton Payne collection of rare paintings and the most extensive collection of Confederate portraiture in existence.

Hollywood Cemetery, 412 South Cherry Street, burial place of two Presidents of the United States, Monroe and Tyler, and of Jefferson Davis, members of his family and numerous Virginia governors.

St. John's Church, Twenty-fourth and Broad Streets, where Patrick Henry delivered his immortal "Liberty or Death" oration on March 20, 1775.

Edgar Allan Poe Shrine at 1916 East Main Street, the oldest house in the city. This building now houses a collection of Poe's original manuscripts and many mementoes.

Monument Avenue, upon which has been erected statues of Robert E. Lee, J. E. B. Stuart, "Stonewall" Jackson, Matthew Fontaine Mury and a memorial to Jefferson Davis.

But the tourist trade is but one of many important factors in the commercial life of Richmond. Thousands of persons are given work in tobacco plants of the city. Paper manufacturing, printing, publishing and related arts; iron and steel, rayon and cellophane, bakeries, wholesale and jobbing establishments, retail stores—all of these are important considerations in any review of the city's economic stability.

Richmond's wholesale trade area covers thousands of miles. Her manufactured products are known throughout the world. The fifty-mile retail trade territory embraces a population in excess of 600,000 persons, the majority of which look to the city as their logical shopping center. This trade territory is well developed and represents the highest purchasing power of Virginia.

Statistical evidence of the city's manufacturing, financial, and commercial growth is presented in the following tables, which represent only a partial review of the many barometers of trade:

Value of Manufactured Products		*Savings Deposits*	
1923	$143,417,557	1926	$36,857,960
1925	157,449,998	1927	40,098,990
1927	220,742,721	1928	41,134,264
1929	234,619,094	1929	41,173,278
1931	252,556,265	1932	46,323,555

Internal Revenue Receipts		*Telephone Connections*	
1925	$51,935,263	1925	33,786
1926	60,716,465	1926	35,912
1927	84,839,146	1927	36,915
1928	84,331,282	1928	38,500
1929	92,253,554	1929	40,951
1930	105,574,242	1930	42,692
1931	107,095,793	1931	44,361
1932	98,802,027	1932	40,620

Postal Receipts		*Custom Receipts*	
1923	$1,714,333	1925	$1,869,075
1925	1,965,819	1927	2,321,624
1927	2,243,859	1929	3,218,993
1929	2,134,260	1932	2,946,466
1931	1,929,699		
1932	1,913,507		

After Richmond, Washington

SIX MILLION DOLLARS' WORTH OF EMBASSIES*

Slightly more than a stone's throw from the White House, home of presidents since the days of George Washington, a striped flag of blue and white, with a central spattering of stars, floats in the wind before a drab, sedate dwelling.

The flag is the national banner of Honduras, and the little island of soil over which it flies, while in essence American, is in truth foreign territory, where the laws of a land far removed from these United States obtain.

There are more than 50 of such domains within the city limits of the National Capital, homes and headquarters for the ambassadors and ministers of the more than half a hundred foreign nations that have seen fit to station representatives in America to conduct their affairs of state.

The total value of the lands and improvements of the embassies in Washington reaches the large figure of $6,000,000. The largest investment is that of Great Britain at 3100 Massachusetts Avenue. This embassy cost more than $1,000,000.

Along the stately stretch of Sixteenth Street, which leads like a glamorous pathway from the very front door of the President's house, lie the bulk of the embassies and legations housing the envoys of the other world powers.

Even closer to the Executive Mansion than the Honduran Legation, just across LaFayette Park from the White House itself, are the offices of the Turkish Embassy, quartered in an exclusive hotel. The ambassador

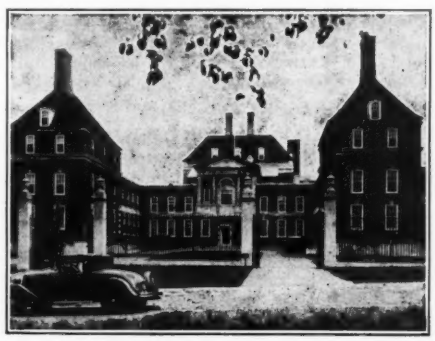
*By Curtis Hodges, Executive Director of the Greater National Capital Committee of the Washington (D.C.) Board of Trade.

from Turkey, however, resides on Massachusetts Avenue, west of Sixteenth Street.

The Soviet Government, which the United States still declines to recognize, cannot, of course, occupy an embassy in Washington, or for that matter in any part of America. It is entitled to a financial agency, which it maintains in New York City.

But a dank and decaying home on the famous Sixteenth Street, practically opposite the Honduran Legation, still gives to all the world a vivid reminder of the grandeur and splendor that was Czarist Russia. It is a quiet four-story white-stone-and-light-brick structure that today retains the status of an embassy, and as such is exempt from taxation by the District of Columbia Government. The handsome building is the one-time embassy of the provisional government of Russia which Kerensky established following the fall of the Czarist regime. But Kerensky's "house of cards" administration has long since collapsed, and Soviet Russia has taken its place.

In the meantime, the grand residence of Russia's envoys of another day stands a veritable ghost. Only one wing, erected by the Russians after they took over the splendid residence, boasts occupancy, and that by a Russian scientist, now an American citizen, who lives there as a personal favor to Russia's financial agent in New York and superintends what little care the embassy gets. Its lawns are neatly clipped, its walks swept by a janitor paid by the financial agent out of his own funds, and the outward appearance of this embassy building is not unlike any town house that has been boarded up because of the absence of the owners.



British Embassy

Great Britain abandoning a grand old mansion on dignified Connecticut Avenue which was His Majesty's diplomatic headquarters in America for more than threescore years, pitched her tent on new soil, and added a new and lasting landmark to the long list of notable structures in the National Capital. In planting the Union Jack over new ground, Britain chose a site in pleasant surroundings high up on Massachusetts Avenue, and in so doing added another embassy to that thoroughfare's rapidly growing "embassy row". This honor, to date, has belonged to Sixteenth Street, which, with its various contiguous byways, has set up a virtual "Quartiers Diplomatique."

An imposing example of the Queen Anne style of architectural motif, the British Embassy is a monumental edifice and sets a new standard for buildings of this type in the entire world. The development represents 185,000 square feet of ground, over which no policeman, investigator or even anti-liquor officers, under the American government, can claim jurisdiction. The home and its surroundings were planned with an eye to the entertainment and social functions so indissolubly a part of the diplomat's life in Washington.

Japan, which formerly leased a building for its embassy on Sixteenth Street, moved into the simple, dignified white stone building with green shutters that lies little more than a city block eastward from the sumptuous dwelling of Britain's ambassador. An impressive link in the chain of homes of representatives of foreign governments in America's capital, the Japanese embassy occupies an extensive site of 65,000 square feet of ground and its cost is believed to have approached the half-million dollar mark. The exterior view obtained by the passer-by of this plain and impressive diplomatic home hardly conveys the idea of spaciousness and generous dimension which is immediately conceived upon entering the building. Handsome Greek columns separate the wide entresol from the long corridor which bisects the structure. Abutting rooms give off this hallway in wing-fashion, and a spiral stairway with wrought iron balustrade leads to the floors above.

The embassy's furnishings are luxurious. Fine porcelain and cloisonne pieces are to be seen on mantels and tables, while Tokio has supplied rare paintings and other objects d'art to adorn the rooms and walls of the Mikado's American domicile.

Austria, following in the footsteps of Britain and Japan, also acquired a site on Massachusetts Avenue for its new legation, and has built a home in the fashionable Sheridan Circle section, not far removed from the dwelling of Mrs. Woodrow Wilson, widow of the war-time President.

Book Reviews

Surgery of the Stomach and Duodenum. By J. Shelton Horsley, M.D., F.A.C.S., LL.D., Attending Surgeon, St. Elizabeth's Hospital, Richmond, Va. 260 pages with 136 illustrations. St. Louis: The C. V. Mosby Company, 1933. Cloth, $7.50.

The title of the book, "Surgery of the Stomach and Duodenum," does not fully express its content, for it is really a very complete monograph on the surgical diseases of the stomach and duodenum. The embryology, surgical anatomy and physiology serve as an introduction, but references to physiology are made throughout the volume, as function is constantly kept in mind. Minute details of operative technic, with reasons for variations from the usual procedures and a great number of fine illustrations, are a source of great comfort to those of only average experience.

The personal experiences of a deep student and finished surgeon are related on every page, giving added weight to each recommended procedure, as for example in the discussion of gastric resection for carcinoma, namely: that in a series of deaths from this disease 23 per cent showed no metastases, whereas in a still larger series of cases, Saltzstein and Sandweiss resected the

stomach in but 7.7 per cent of instances, showing a lost opportunity for cure in many of them.

The exhaustive review of the literature, its careful evaluation, the large number of personal case reports scattered through the different sections of the book, and the author's rugged honesty, make a strong appeal. The reviewer knows of no similar work which can compare in completeness, modernness and general reliability with this new volume by Horsley.

General Surgery; The Practical Medicine Series, 1932. Edited by Evarts A. Graham, A.B., M.D., Professor of Surgery, Washington University School of Medicine; Surgeon-in-Chief of the Barnes Hospital and of the Children's Hospital, St. Louis. 816 pages. Chicago: The Year Book Publishers, Inc., 1932.

This volume on surgery is unusually replete with abstracts from the foreign literature. The pendulum is swinging back from the enthusiasm of a short time ago in the use of spinal anesthesia. Certain dangers are being pointed out and pulmonary complications have followed the use of this anesthetic. Local anesthesia in fractures is again discussed by R. C. Carothers. Transillumination of the mammary glands has proven valuable as a diagnostic aid in an additional number of cases. The surgical treatment of pulmonary pthisis is being more extensively undertaken. Elkin describes a flap exposure of the heart. An interesting editorial comment on foreign bodies in the stomach follows an article on that subject. "Even pins and other sharp objects when swallowed by children are spontaneously evacuated. We have not operated on such a case for the past ten years."

Practical Hematological Diagnosis. By O. H. Perry Pepper, M.D., Professor of Clinical Medicine, University of Pennsylvania; and David L. Farley, M.D., Physician to the Pennsylvania Hospital. 562 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1933. Cloth, $6.00 net.

For convenience the subject has been divided into three parts. The first is a study of the structure of the blood and its component parts, and methods of study with a discussion of their practical significance. The second part concerns itself with the laboratory examination of the blood in diseases of the blood forming system. The third part describes the hematologic findings when the blood is secondarily affected.

If one is looking for a heavy, ponderous work on the blood he must look elsewhere. The subject has been stripped of the non-essentials and made as practical as possible. The illustrations, instead of Giemsa stain which is little used in this country, are stained with Wright's. The practitioner is given every facility and help possible by the authors to aid in blood diagnosis.

Notes on Vitamins and Diets. By Daniel Thomas Quigley, M.D., F.A.C.S., Instructor in Surgery in the University of Nebraska College of Medicine. 128 pages, illustrated. Chicago: Consolidated Book Publishers, Inc., 1933. Cloth, $1.00.

The information given is up to date, the style clear and popular. This is a useful short treatise for patients.

Holt's Diseases of Infancy and Childhood. By the Late L. Emmett Holt, M.D., and John Howland, M.D., and revised by L. Emmett Holt, Jr., M.D., Associate Professor of Pediatrics, Johns Hopkins University, and Associate Pediatrician to the Harriet Lane Home, Johns Hopkins Hospital, Baltimore, and Rustin McIntosh, M.D., Carpentier Professor of Diseases of Children, Columbia University, and Physician-in-Chief to the Babies' Hospital, New York City. Tenth Edition. 1240 pages, illustrated. New York and London: D. Appleton & Co., 1933. Cloth, $10.00.

In the preface to the ninth edition of this book, E. A. Park made the statement that, in his opinion, it was the best text book of pediatrics in the English language. The tenth edition, which has L. Emmett Holt, Jr., and Rustin McIntosh as its authors, upholds in every way the standard set by all previous editions and it still remains without a peer in its particular field of medical publications.

A period of seven years has elapsed since the publication of the ninth edition and during this time many advances have been made in our knowledge of pediatrics. This has necessitated the complete rewriting of the sections on nutrition and nutritional disorders, deficiency diseases, diseases of the blood and allergy.

Many articles have been rewritten, notably those on premature infants, diabetes mellitus, tuberculosis and the common cold. New articles have been added on chemical relations in childhood, serum disease, lead poisoning, encephalitis and many others.

The book is profusely illustrated and liberal use is made of tables and charts.

The publishers are to be congratulated on their success in the selection of authors to make the necessary revisions which has made it possible for this book to maintain its position of leadership in pediatric literature for nearly thirty years.

Dietetics for the Clinician. By Milton Arlanden Bridges, B.S., M.D., F.A.C.P., Associate in Medicine at the New York Post-Graduate Medical School, Columbia University, New York. In collaboration with Ruth Lothrop Gallup, Dietitian. Foreword by Herman O. Mosenthal, A.B., M.S., Director of Medicine at the New York Post-Graduate Medical School, Columbia University, New York. 666 pages. Philadelphia: Lea and Febiger, 1933. Cloth, $6.50.

The reader is introduced to a study of the chemical constituents of foods and the physiology of their metabolism. Comment is also made in the first section upon the cooking and serving of the diets.

A large number of pathological conditions are discussed in the second section. These are listed alphabetically for easy reference. The discussion under each heading gives the reasons for omitting certain foods, lists those that may be allowed within limits and outlines a number of simple menus. In certain cases suggestions for dietetic changes are given in anticipation of complications that might arise during the course of the treatment. The diet lists given, except in those of obesity and diabetes, lack specificity as to the amount allowed at each meal.

A special section is devoted to pediatric feeding. The appendix contains practical recipes, dietetic notes and tables of food constituents. Any one interested in the dietetic treatment of disease will find a great deal of valuable information at his disposal in this book.

Diet in Sinus Infections and Colds. By Egon V. Ullmann, M.D., Formerly Special Lecturer for Biology at the Oregon State College; Instructor at the First Medical Clinic at the University of Vienna; Member of the Research Staff of the State Serum Institute of Austria. 166 pages. New York: The Macmillan Company, 1933. Cloth, $2.00.

The author calls this "the first systematic attempt to apply the modern knowledge of nutrition to individuals who suffer from repeated colds and sinus disease." One of his suggestions is that people who are subject to colds should not bathe daily. High points of his diet are: use of base-forming foods, the avoidance of all canned foods and of table salt, limitation of meat and sugars and abundance of fruit juice. There is no reason to think that his advice would not be beneficial in sinus disease, or that it would be more helpful in this condition than in for instance arthritis or arteriosclerosis. Nothing new or original is suggested, and no evidence of any particular potency of the diet is offered.

Modern Alchemy. By William Albert Noyes, University of Illinois, and W. Albert Noyes, Jr., Brown University. 207 pages. Springfield, Illinois: Charles C. Thomas, publisher, 1932. Cloth, $3.00.

The authors deal largely with the nature of the elements. There are chapters on atomic structure, transmutation of the elements, valence, radiation. They discuss as simply as possible these abstruse phenomena of physics and chemistry which have been intensively investigated in the past twenty-five years in all civilized countries of the world. The last chapter, "The Elixir of Life," mentions briefly scientific work which has particular significance in medicine. This includes vaccines, immunity, vitamins, hormones, anesthetics, and synthetic drugs. The book will be greatly enjoyed by those who are well grounded in any one of the medical sciences.

Reconstruction of the Biliary Tract. By Edmund Horgan, M.D., M. S. (in Surgery), F.A.C.S., Washington, D. C. 201 pages with illustrations. New York: The Macmillan Company, 1932. Cloth, $4.00.

A review of all the methods that have been employed and evaluation of them, with many diagrammatic illustrations.

Medical State Board Examinations: Topical Summaries and Answers. By Harold Rypins, A.B., M.D., Secretary, New York State Board of Medical Examiners; Member, National Board of Medical Examiners; Associate in Medicine, Albany Medical College; Former President, Federation of State Boards of Medical Examiners of the United States; Former Instructor in Medicine, University of Minnesota. 448 pages. Philadelphia: J. B. Lippincott Company, 1933. Cloth, $4.50.

After a survey of many thousands of questions used in state board examinations, a brief summary of each subject is given for review by the student. Following this is a list of selected and typical questions. The book will be quite valuable for persons who make out state board examinations, as well as for a medical review.

Synopsis of Gynecology. Based on the Text Book Diseases of Women. By Harry Sturgeon Crossen, M.D., F.A.C.S., Professor of Clinical Gynecology, Washington University Medical School, and Robert James Crossen, M.D., Instructor in Clinical Gynecology and Obstetrics, Washington University School of Medicine. 227 pages, with 110 illustrations. St. Louis: The C. V. Mosby Company, 1932. Cloth, $2.75.

An excellent compend for those who need a working knowledge of gynecology but who will not specialize in it. Methods of examination are given and of treatment, including the technic of abdominal operations. It is well illustrated.

Medicine in Canada. By William Boyman Howell, M.D., Anesthetist in Charge, Royal Victoria Hospital; Lecturer in Anesthesia, McGill University, Montreal. 137 pages with 6 illustrations. New York: Paul B. Hoeber, Inc., 1933. Cloth, $1.50.

Beginning with the pioneer settlers in Quebec, Howell describes the character of medical service there. He gives a vivid description of an autopsy of a case of scurvy in 1535. Early methods in the various Canadian provinces are given, with sketches of the lives of the most influential men. The founding of the Canadian hospitals which later attained distinction, cholera and typhus epidemics are realistically and in a very readable manner depicted.

The New Dentistry. A Phase of Preventive Medicine. Six Lowell Lectures. By Leroy Matthew Simpson Miner, D.M.D., M.D., F.A.C.S., Dean of the Dental School and Professor of Clinical Oral Surgery in Harvard University. 219 pages. Cambridge, Mass.: Harvard University Press, 1933. Cloth, $2.00.

Primitive dentistry in the tombs of Egypt, Greece, Etruria, Peru and other early civilizations is described; also the beginnings of dental schools in America, the relation of the teeth to body health, stressing mainly focal infections, to some extent also diet. This small book will be of interest to the medical profession as well as to the 60,000 dentists of America.

The Physiological Effects of Radiant Energy. By Henry Laurens, Ph.D., Professor of Physiology in the Tulane University School of Medicine, New Orleans, Louisiana. 610 pages. New York: The Chemical Catalog Company, Inc., 1933. Cloth, $6.00.

One of a series of scientific monographs published by the American Chemical Society, this is a detailed review of the outstanding literature on the physiological action of radiant energy.

The author has reviewed, abstracted and indexed almost a thousand articles in the compilation of this source book. He gives a very elaborate account of the physics of this agent so far as it is known. He takes up the effect on the skin, wounds, eye, circulation, blood, metabolism, temperature, respiration, optic sensitization, tuberculosis and bacteria. The abstracts are presented in such a manner that the reader can draw his own conclusions without great effort. Occasionally the writer points out facts that are not obvious. The earnest worker in this field will look upon this text as his bible.

Southern Medical News

ALABAMA

Dr. W. J. Love, Opelika, was reelected Secretary-Treasurer of the Chattahoochee Valley Medical Society at its meeting in July.

The Southeastern Division of the Alabama State Medical Association held its regular meeting in Enterprise July 11.

Dr. Thomas M. Boulware and Miss Mary Irene Hall, both of Birmingham, were married May 30.

Dr. Joseph Garber Cocke, Birmingham, and Miss Violet D. Hoile were married June 5.

Dr. John R. Eggleston, Decatur, and Miss Betty Brewer were married recently.

Deaths

Dr. Benjamin Emmett Graham, Gurley, aged 59, died June 22 as the result of an automobile accident.

Dr. Robert Harold Coker, Tallassee, aged 40, died June 17 in a Montgomery hospital.

Dr. Eugene G. Northington, Birmingham, Lieutenant Colonel, U. S. Army, retired, aged 53, died June 9 in a San Francisco hospital of roentgen ray burns received twenty-four years ago.

ARKANSAS

The State Medical Examining Board held a reorganization meeting at Little Rock in June and elected the following officers for the coming year: Dr. W. W. York, Ashdown, President; Dr. W. T. Lowe, Pine Bluff, Vice-President; and Dr. A. S. Buchanan, Prescott, Secretary-Treasurer.

The Fort Smith Clinical Society, sponsored by the staffs of St. Edward's, Mercy, St. John's and Sparks Memorial Hospitals, held its meeting in June.

Dr. A. B. Jemison, Jefferson County Health Officer, has been made State Epidemiologist and Malaria and Dairy Inspector.

Dr. A. F. Gray, Little Rock, has moved into new offices in the Urquhart Building.

Dr. Charles S. Holt, Fort Smith, was recently reappointed a member of the Board of Trustees of the Arkansas Tuberculosis Sanatorium at Booneville.

The Seventh Councilor District Medical Society met in Hot Springs in June and elected the following officers for the coming year: Dr. Curtis W. Jones, Benton, President; Dr. George F. Holitik, Waldron, Vice-President; and Dr. Charles K. Townsend, Arkadelphia, Secretary-Treasurer.

Dr. H. H. Howze, Little Rock, has been appointed to succeed Dr. A. B. Jemison as Director of the Jefferson County Health Unit, with offices in Pine Bluff.

Dr. Loyd Thompson, formerly of Hot Springs, has moved to San Diego, California.

Deaths

Dr. Luther Edgar Moore, Searcy, aged 72, died June 4 of senility.

Dr. James Henry Jackson, Center Ridge, aged 73, died May 13 in a Morrilton hospital of acute myocarditis.

DISTRICT OF COLUMBIA

Dr. Hugh S. Cumming, Washington, Surgeon General, U. S. Public Health Service, was recently given the honorary degree of Doctor of Laws from Yale University.

Dr. Edward Francis, Washington, associated with the National Institute of Health, recently received the honorary degree of Doctor of Science from Ohio State University.

Dr. M. L. Townsend, Washington, Medical Director of Chevy Chase Sanatorium, has been chosen President of Civitan International.

The Army Medical Center at Walter Reed Hospital, Washington, in a Memorial Day ceremony, May 30, was presented with portraits of three army medical officers. A portrait of Major General William C. Gorgas was presented by Surgeon General Robert U. Patterson in behalf of officers and nurses at the Center; one of Brigadier General James M. Kennedy was presented by General Carl R. Darnall, retired, in behalf of friends; and one of Colonel John Van Rensselaer Hoff was presented by Major General Merritte W. Ireland in behalf of Mrs. Hoff. Portraits were received by Major General Albert E. Truby, Commander of the Medical Center.

The Georgetown University School of Medicine, Washington, announces the following appointments as full-time teaching fellows: Dr. Cyrus M. Gormley, Dr. Percy A. Bryant and Dr. William C. Lambert in Medicine; and Dr. Henry Wigderson in Surgery.

Dr. Wilbur F. Potter, Ph.D., formerly in the Medical Department of the University of Georgia, has been appointed Assistant Professor of Physiology and Pharmacology at Georgetown University School of Medicine.

The following members of the Medical Society of the District of Columbia were among the newly elected officers of the General Alumni Association of George Washington University: Dr. Daniel LeRay Borden, President; Dr. Ella M. A. Enlows and Dr. Frederick A. Reuter, Vice-Presidents.

FLORIDA

The Florida Railway Surgeons' Association held its fourteenth annual meeting recently and elected the following officers for the coming year: Dr. W. C. Page, Cocoa, President-Elect; and Dr. H. Gates, Bradenton, Vice-President. Dr. Jack Halton, Sarasota, is the incoming President.

The Florida Dermatological Society held its regular quarterly meeting at Jacksonville in July.

The University of Florida Extension Division and the Florida Medical Association recently sponsored a Graduate Short Course for Doctors of Medicine in Florida, which was held at the University in Gainesville.

New members of the State Board of Health, recently appointed by the Governor, are Dr. N. A. Baltzell, Marianna; Dr. Leland H. Dame, Inverness; and Dr. Harry Dash Johnson, Daytona Beach. Dr. Baltzell is the newly elected President of the Board.

Dr. Corbett E. Tumlin, Miami, was recently elected President of the State Board of Medical Examiners to succeed Dr. Carl A. Williams, St. Petersburg; Dr. Simeon E. Driskell, Jacksonville, was elected Vice-President; and Dr. William M. Rowlett, Tampa, was reelected Secretary.

Dr. E. B. Maxwell, Miami, is spending some time in the North, where he will attend clinics in New York and Chicago.

Dr. Graham E. Henson, Jacksonville, has opened offices in the St. James Building for the practice of internal medicine, having resigned as Chief Medical Officer of the United States Veterans' Administration.

Dr. J. A. Pines, Orlando, is taking postgraduate work in x-ray at Chicago and Rochester, Minnesota.

Dr. Horace A. Day, Orlando, has been appointed to succeed Dr. N. A. Baltzell, Marianna, resigned, as a member of the State Board of Medical Examiners.

Dr. Harper L. Proctor, Jacksonville, has moved into new offices in the Greenleaf Building.

Dr. S. J. Simmons, Jr., has moved from Clewiston to Arcadia.

Dr. Hubert A. Barge and Miss Drucilla Albreast, both of Miami, were married in the spring.

Dr. Warren E. Anderson and Miss Sophie Lee, both of Pensacola, were married in June.

Deaths

Dr. Hobart Jay Holcomb, Deland, aged 73, died June 25 of cerebral hemorrhage.

Dr. W. K. Lane, Ocala, aged 55, died June 8.

GEORGIA

The regular scientific meeting of the Georgia Pediatric Society will be held in Atlanta Thursday, October 12. A very attractive program is being arranged. There will be a demonstration at the Henrietta Eggleston Memorial Hospital for Children on Thursday morning by Dr. Charles Gilmore Kerley, New York City, on "Intestinal Dysfunction in Children," and on Thursday evening Dr. Kerley will read a paper entitled "A Study of Mental Retardation in Children."

The Medical School at Augusta will continue open, following a resolution adopted recently by the regents of the University System of Georgia for its continuation, this superseding a previous resolution to close the school.

The Georgia Urological Association, at a recent meeting, elected the following officers for the coming year: Dr. Walter B. Emery, Atlanta, President-Elect; and Dr. Major F. Fowler, Atlanta, Secretary Dr. John William Shearouse, Savannah, is the newly installed President for the coming year.

Dr. Victor H. Bassett, Savannah, City Health Officer, recently placed on exhibit in the Savannah Public Library a collection which he has assembled of pamphlets, books, instruments, articles of equipment and manuscripts used in the early medical practice of Georiga, many of these articles belonging to the State Society.

At the meeting of the Chattahoochee Valley Medical and Surgical Association in July, Dr. A. H. Hilsman, Albany, was elected President for the coming year; and Dr. W. J. Love, Opelika, Alabama, was reelected Secretary-Treasurer.

Dr. William R. Houston, Augusta, is the newly elected Chairman of the Richmond County Board of Health.

The Burke County and the Jenkins County Medical Societies held a joint meeting at Millen in June, enjoying a Dutch dinner followed by a scientific program.

The Sixth District Medical Society met at Macon in June for a scientific program.

Continued on page 18

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PHARMACEUTICALS BIOLOGICALS

PHILADELPHIA BALTIMORE MONTREAL

Continued from page 832

Dr. O. R. Thompson, Macon, has opened a prenatal clinic at the Utility Club's Clinic and Milk Station in South Macon.

Dr. J. A. Thrash, Columbus, is the newly elected Commissioner of Health of Muscogee County.

Dr. Thomas R. Aycock, Monroe, is taking postgraduate work at the Tulane University of Louisiana Graduate School of Medicine, New Orleans.

Dr. Oliver Artega, Atlanta, has opened an office in the Atlanta National Bank Building, with practice limited to diseases of the eye, ear, nose and throat.

Dr. Montague L. Boyd, Atlanta, has been elected a trustee of the American Urological Association.

Dr. and Mrs. W. V. Chandler, Baldwin, were hosts recently to members of the Habersham County Medical Society and the Auxiliary.

DEATHS

Dr. Emmanus M. Jennings, Menlo, aged 64, died June 17 of heart disease.

Dr. Joseph Allison Jarrell, Jackson, aged 74, died June 8 of carcinoma of the stomach.

Dr. Forrest Lee Cosby, Columbus, aged 68, died June 11 in a Columbus hospital.

Dr. Theodore Eugene Oertel, Augusta, aged 69, died June 27.

Dr. John Dooley Mauldin, Gainesville, aged 57, died June 6 of cardiorenal vascular disease and arteriosclerosis.

KENTUCKY

Dr. Nathaniel A. Mercer, Director of the Adair County Health Department, has resumed his duties after a year's absence spent in study at Harvard University.

Dr. Gradie R. Rowntree has succeeded Dr. Milton W. Williamson as Health Officer of Green County. Dr. Rowntree served during Dr. Mercer's absence as Director of the Adair County Health Department.

Dr. Joseph C. Browning, Germantown, was recently honored by citizens of Germantown with a dinner celebrating his fiftieth anniversary in the practice of medicine and his seventy-eighth birthday.

The Wolfe County Medical Society, at its regular meeting recently, elected the following officers for the coming year: Dr. J. H. Dunn, Lee City, President; and Dr. G. M. Center, Campton, Secretary-Treasurer.

Dr. Kenneth Newton Gould, Pine Mountain, and Miss Elizabeth Barrett were married in June.

DEATHS

Dr. William E. Truesdell, Alexander, aged 64, died May 26 of carcinoma.

Dr. George J. Hermann, Newport, aged 59, died June 8 of coronary thrombosis and chronic nephritis.

Dr. Samuel J. Rose, Lexington, aged 46, died June 12.

Dr. John W. Naylor, Cayce, aged 67, died May 7 of malignant tumor of the throat.

Dr. Oliver S. Kash, Carlisle, aged 77, died June 24 of carcinoma of the throat.

Dr. George P. Oldham, Raywick, aged 75, died June 3 of uremia.

Dr. Elijah Robert Blalock, New Concord, aged 54, died May 23 of heart disease.

Dr. Tobe Turner Webb, Laynesville, aged 53, died suddenly May 19 of cerebral hemorrhage and arteriosclerosis.

LOUISIANA

Dr. H. W. E. Walther, New Orleans, was reelected delegate from the Section on Urology to the House of Delegates of the American Medical Association at the recent annual meeting of the Association in Milwaukee.

Dr. L. L. Lumsden, Medical Director, U. S. Public Health Service, New Orleans, recently went to Baton Rouge, Shreveport, and other places in the State for tuberculosis investigation.

Continued on page 20

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Continued from page 18

Dr. Leonel L. Kahn, Rayne, and Miss Emeline Weill were married in June.

DEATHS

Dr. William Wallace Burckhalter, Tunica, aged 70, died June 14 of erysipelas.

Dr. Pierre Leonce Thibaut, New Orleans, aged 57, died June 14 of heart disease.

Dr. Irby B. May, Columbia, died June 21 in a Monroe hospital of injuries received in an automobile accident.

Dr. Adrian Hava, New Orleans, aged 69, died May 29 of bronchopneumonia and dilatation of the heart.

Dr. George King Pratt, Jr., New Orleans, aged 49, died June 9 of heart disease.

MARYLAND

The Medical and Chirurgical Faculty of Maryland will hold its semiannual meeting at Cumberland September 28 and 29, with headquarters at the Fort Cumberland Hotel.

Dr. Joseph Colt Bloodgood, Baltimore, conducted a postgraduate institute at Meridian, Mississippi, in June, under the sponsorship of the East Mississippi Medical Society, the institute consisting of lectures and clinics.

Dr. Hugh H. Young, Baltimore, has received the honorary degree of Doctor of Philosophy from Queen's University, Belfast, Ireland.

Dr. Anthony L. Rettaliata, Baltimore, connected with the Baltimore Health Department since 1911, has recently been appointed full-time medical health officer of Baltimore to serve as consultant to practicing physicians in the diagnosis and investigation of communicable diseases.

Dr. J. O. Dean, formerly of Lawrenceville, Virginia, has been assigned to duty at Rockville.

A portrait of the late Dr. Charles Hampson Jones, City Commissioner of Health, Baltimore, was unveiled recently at a memorial meeting in Baltimore, and will be placed in the offices of the City Health Department.

Dr. Dean Lewis, Baltimore, Professor of Surgery at Johns Hopkins University School of Medicine, has been given the honorary degree of Doctor of Science from the National University of Ireland at Dublin.

Dr. Howard A. Kelly, Baltimore, Emeritus Professor of Gynecology at Johns Hopkins University School of Medicine, has been given the honorary degree of Doctor of Laws from Washington College at Chestertown.

DEATHS

Dr. Frederick Henry Baetjer, Baltimore, aged 59, died in July.

Dr. James C. Littleton, Baltimore, aged 85, died June 9 of bronchopneumonia.

Dr. James Harry Ullrich, Baltimore, aged 58, died June 27 of suppurative pancreatitis.

Dr. James L. Ridgely, Baltimore, aged 65, died May 25 of myocarditis.

Dr. Alfred Henry Albert Mayer, Baltimore, aged 68, died May 15 of carcinoma of the lung.

MISSISSIPPI

The Winston County Medical Fraternity, at a recent meeting, elected the following officers for the coming year: Dr. W. W. Parks, President; Dr. E. L. Richardson, Louisville, Vice-President; and Dr. M. L. Montgomery, Louisville, Secretary.

Dr. Fred Sandifer, Greenwood, recently returned from the University of Chicago, having been awarded the Henry M. Layman Memorial Prize for excellent work in the Department of Medicine.

Dr. W. L. Watkins has been appointed County Health Officer of Neshoba County, succeeding Dr. W. J. Stribling, Philadelphia.

Dr. J. R. Plummer, formerly of Deemer, has located at Philadelphia.

Dr. Bryant Wilson has located at Philadelphia for the practice of medicine, having just completed an internship in a Memphis hospital.

Continued on page 22

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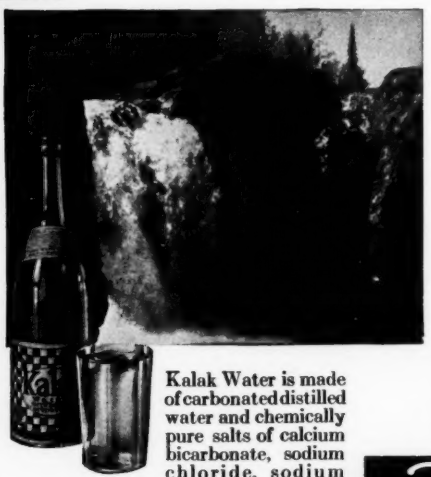

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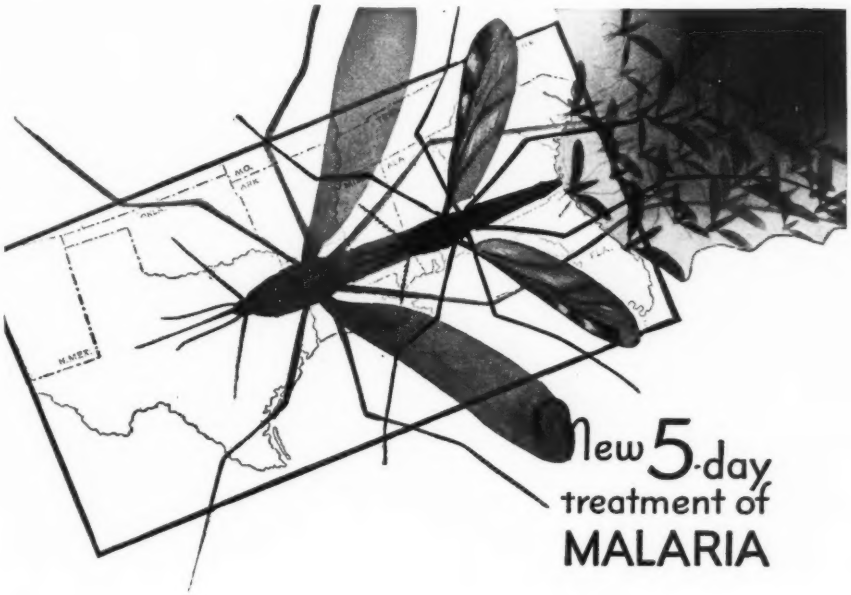

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LOUISVILLE, KENTUCKY

Continued from page 20

Dr. E. L. Richardson, Philadelphia, was recently reelected County Health Officer for Winston County.

Dr. George E. Riley, Jackson, connected with the State Board of Health, has received his certificate of public health at Johns Hopkins, where he has been studying. Before returning to Mississippi the first of July, Dr. Riley spent some time in Florida observing the malaria control program there.

Dr. A. L. Gray, formerly Director of the Copiah County Health Department, has been placed in charge of the Epidemiological Unit for the Mississippi State Board of Health.

The Homochitto Valley Medical Society held a meeting in July and had in conjunction with their meeting the regular staff meeting of the Field Memorial Hospital.

Dr. Ira B. Bright, Jr., has located in Greenwood for the practice of general medicine, having just completed an internship at Touro Infirmary, New Orleans.

Dr. C. E. Baldree, Jr., formerly of Electric Mills, has moved to Belleville, Illinois.

Deaths

Dr. Clyde Ray Stingily, Meridian, aged 53, died June 24 of heart disease.

Dr. Albert S. Applewhite, Jackson, aged 63, died June 6 of heart disease.

MISSOURI

The Tuberculosis Ball Game played annually in St. Louis, and sponsored by the Tuberculosis and Health Society of St. Louis, proceeds of which are used to feed undernourished children of St. Louis and St. Louis County, was played July 13.

Dr. J. Curtis Lyter, St. Louis, is in Europe, where he went to attend the International Congress for the Study of Diseases of the Thyroid Gland, which was held in Berne, Switzerland, August 10, 11 and 12. Dr. Lyter will also attend clinics in Paris and Vienna.

The St. Louis Clinics have opened a contest which offers an annual award of $100.00 and a certificate of award to the member of the St. Louis Medical Society who presents the best paper at the St. Louis Medical Society during the year, the contest to open January 1, 1934.

Dr. Chris M. Sampson, St. Joseph, was on the program for an address before the National Society for Physical Therapeutics at the forty-first annual convention of the Society.

Dr. John Zahorsky, St. Louis, has been made Director of the Department of Pediatrics of St. Louis University School of Medicine.

Dr. Lloyd Frick Kaiser, St. Louis, and Miss Hattie May Jury were married June 19.

Deaths

Dr. William F. Justice, Lancaster, aged 79, died June 26 of myocarditis.

Dr. Theodore Allen Prouse, Greenfield, aged 59, died May 27 of acute dilatation of the heart.

Dr. Edward H. Kessler, St. Louis, aged 68, died June 10 of heart disease.

Dr. John Robert Durrett, Nelson, aged 59, died May 27 of cerebral hemorrhage.

Dr. Albin Monroe Painter, Kansas City, aged 52, died May 19 of heart disease.

Dr. Andrew D. Steele, Perryville, aged 64, died May 17 of angina pectoris.

Dr. Wenzel C. Gayler, St. Louis, aged 56, died July 12 following an operation for tumor of the brain.

Dr. Edgar Armistead Dulin, Nevada, aged 89, died May 16.

Dr. William J. Langan, Sr., St. Louis, aged 82, died May 22.

Dr. William M. Robertson, St. Louis, aged 67, died June 6.

NORTH CAROLINA

The Roaring Gap Children's Hospital at Roaring Gap opened in June for the 1933 season.

The William A. Johnson Medical Building, Wake Forrest, was completed recently, and the Medical School has moved into its new quarters.

Dr. P. P. McCain, Sanatorium, was recently reelected a Director of the National Tuberculosis Association; and Dr. R. L. Carlton, Winston-Salem, was elected a member of the Executive Committee of the Association.

The North Carolina Urological Association met recently in Greensboro.

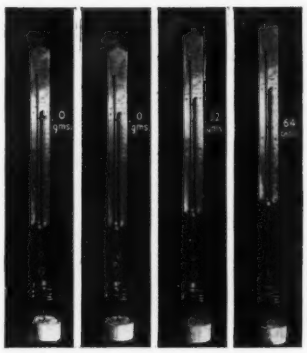
Continued on page 26

CURD TENSION

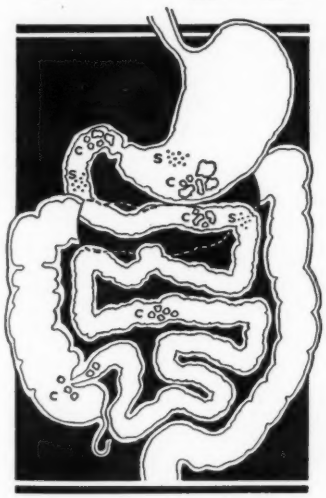
- AND INFANT FEEDING -

ITS · EFFECT · UPON · THE · ASSIMILATION · OF

FATS



BREAST MILK SIMILAC POWDERED MILK COW'S MILK



C—Cow's milk S—Similac
Schematic drawing of the relative size of the curds of cow's milk and Similac vomited by six weeks old puppies after one-half hour's ingestion.

"FAT has a caloric value more than twice that of either carbohydrates or protein and serves very well to make up the necessary energy or caloric requirement. Two of the important vitamins, 'A' and 'D', are associated with the fat of milk and when the diet is low in milk fat these vitamins must be supplied in some other form." [1]

"When milk curdles in the infant's stomach it entangles a large proportion of the milk fat in its meshes and only such fat as lies near the surface of the curd can be reached by the digestive juices. The amount of fat in the curd depends upon the amount of fat in the milk." [2]

The soft, fine curds of SIMILAC, which register zero on the tensiometer, expose a greater surface area for the digestion of the fat than do the large, tough curds of fresh cow's milk.

The finer the curd the greater the surface area. The greater the surface area the more exposed are the fats, carbohydrates, proteins and salts to the digestive enzymes. Result . . . a more complete utilization of the food elements.

[1] Marriott: Infant Nutrition, pg. 49.

[2] Talbot: Morse and Talbot, Diseases of Nutrition and Infant feeding, pg. 48.

Samples and literature will be sent on receipt of your prescription blank.

SIMILAC—Made from fresh skim milk (casein modified); with added lactose, salts, milk fat and vegetable and cod liver oils.

M & R
DIETETIC LABORATORIES, INC.,
COLUMBUS, OHIO.

SUPERSEDING ANTISEPTICS and CATHARTICS in INTESTINAL TOXEMIAS

The futility of attempting to treat intestinal putrefaction with strong antiseptics and violent purgatives is well known.

Antiseptics strong enough to kill bacteria in the intestine are also likely to kill the normal symbiotic bacteria and also to have some effect on the mucosa.

Laxatives, cathartics and purgatives, likewise, are apt to be only temporary in effect.

Treatment of these low grade intestinal infections with KARICIN is a safe and rational procedure, because it combines adsorption of putrefactive bacteria and their products, detoxification and passive elimination in an efficient and effective formula.

KARICIN consists of colloidal kaolin, Soricin (purified sodium ricinoleate) and mineral oil in a fine emulsion. None of the ingredients is absorbed through the bowel, and no irritation is caused in their passage.

KARICIN neutralizes and eliminates pathogenic bacteria and their toxic products without interfering with the normal flora.

Sample and literature on request

THE WM. S. MERRELL COMPANY
Cincinnati, U. S. A.

HIS mother has measured out the Evaporated Milk, water, *everything*, just as your formula said. Yet . . .

Is that the brand of Evaporated Milk you would have chosen?

When you wrote Evaporated Milk into that formula, you had in mind a grade that would meet your high standards of quality. But the average mother, lacking such standards, chooses on the basis of lay opinion only.

In the matter of brand choice, she needs your professional advice.

Among the brands of Evaporated Milk that a physician can recommend unreservedly for infant feeding are those produced by The Borden Company. For seventy-five years, Borden has maintained the highest standards of milk selection and the most rigid requirements throughout the process of manufacture. These standards and requirements prevail today in the production of all the Borden brands . . . Borden's Evaporated Milk . . . Pearl . . . Maricopa . . . Oregon . . . St. Charles . . . Silver Cow. All are accepted by the American Medical Association Committee on Foods.

Write for free sample of Borden's Evaporated Milk and scientific literature. Address The Borden Company, Dept. 525, 350 Madison Avenue, New York, N. Y.

ACCEPTED AMERICAN MEDICAL ASSN. Committee on Foods

The Borden Company was the first to submit evaporated milk for acceptance by the Committee on Foods of the American Medical Association. Borden's was the first evaporated milk to receive the seal of acceptance of this Committee.

Borden's

EVAPORATED MILK

Continued from page 22

Dr. Harold Amoss, formerly of Duke University, Durham, has resigned the chair of medicine, and has located at Greenwich, Connecticut, to practice and do research work at the Rockefeller Institute.

Dr. Fred M. Hanes, Winston-Salem, has succeeded Dr. Harold Amoss to the chair of medicine at Duke University.

Dr. Ethel M. Browsberger has opened offices in Biltmore for the practice of obstetrics and child hygiene.

Dr. William P. Richardson, Winston-Salem, is the newly elected Health Officer of Richmond County, succeeding Dr. Crete N. Sisk, Rockingham.

Dr. L. R. Kirkpatrick has moved from Bennettsville to Belton.

Dr. A. B. Craddock and Miss Ann Hartley Luckett, both of Asheville, were married in June.

Dr. T. C. Bost, Charlotte, and Miss Vera Ledwell were married June 17.

Dr. Kenneth M. Cloninger, Conover, and Miss Ruby Lee Anderson were married June 29.

Dr. Alexander McNeil Cox, Greensboro, and Miss Thelma E. Beazley were married in June.

Dr. John Malloy Clayton Covington, Roanoke Rapids, and Miss Madge Westmoreland were married recently.

DEATHS

Dr. John W. Speight, Roper, aged 67, died June 23 of heart disease.

Dr. Golan Sampson Perry, Raleigh, aged 42, died May 28 of cerebral hemorrhage.

Dr. Solomon Spainhour Flynt, Rural Hall, aged 72, died June 19.

Dr. W. F. Robinson, Mars Hill, aged 64, died July 1 of angina pectoris.

Dr. W. K. Lane, a native of Goldsboro, aged 55, died June 8 in Florida.

OKLAHOMA

The Muskogee County Medical Society were guests in June at a meeting of the Muskogee County Dental Society.

BACILLUS ACIDOPHILUS CULTURE
(B. A. CULTURE)

is a pure liquid suspension of Bacillus Acidophilus issued in 4-ounce bottles.

is agreeable to taste and acceptable to the patient, and well adapted to infant as well as adult use.

Would you like to give B. A. CULTURE a clinical trial? Samples for this purpose will gladly be furnished upon request.

B. B. Culture Laboratory, Inc.
Yonkers, New York
(Producers of lactic cultures since 1910.)

Dr. J. M. Byrum, Shawnee, was recently reappointed Secretary of the State Board of Medical Examiners for a term of four years.

The Canadian County Medical Society met in June for their regular quarterly session, at which time they were guests of Dr. and Mrs. Joseph T. Phelps for dinner, followed by a scientific program.

DEATHS

Dr. David Albert Beard, Tulsa, aged 56, died suddenly June 27 of heart disease.

Dr. Clarence Erroll Wilson, Boise City, aged 46, died June 22.

Dr. Andrew C. Enochs, Oklahoma City, aged 74, died May 17 of cerebral hemorrhage.

SOUTH CAROLINA

The South Carolina Tuberculosis Association conducted clinics in tuberculosis this year at Spartanburg, Florence, Pinehaven and State Park.

Dr. Edward P. White, Gaffney, Health Officer of Cherokee County, was recently elected President of the South Carolina Public Health Association.

Dr. George R. O'Daniel, St. George, recently resigned as Health Officer of Dorchester County, and will locate in Hartsville to enter private practice.

Dr. John C. Caldwell, Chester, has been appointed to succeed Dr. Robert E. Abell, resigned, as a member of the State Board of Medical Examiners.

Dr. L. H. McCalla, Greenville, is taking some work in surgery at the Mayo Clinic.

Dr. J. H. Crooks has opened offices in Greenville to practice dermatology and syphilology.

Dr. Clarence Edens has located at Greer.

Dr. E. H. Thomason has located at Inman.

Dr. Job Hughey Crooks, Greenville, and Miss Edith Wilder were married in June.

Dr. Everett W. Crough, Jr., Columbia, and Miss Olivia Tindale were married June 30.

Dr. Samuel J. McDonald, Jr., Sumter, and Miss Natalie C. Frederick were married June 12.

DEATHS

Dr. Joseph Brantley Harvey, Hampton, aged 66, died in May.

Dr. Henry Perry Jackson, Charleston, aged 70, died June 4.

TENNESSEE

Dr. R. L. Sanders, Memphis, attended the International Goiter Conference which met in Berne, Switzerland, August 10, 11 and 12. Dr. Sanders was the official representative of the Southern Medical Association at this Conference.

Continued on page 28

Classified Advertisements

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from author's data. Ten years' experience with leading physicians and appointments on medical journals of highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 413 St. James Place, Chicago, Ill.

DRUG AND ALCOHOL PATIENTS are humanely and successfully treated in Glenwood Park Sanitarium, Greensboro, N. C.; reprints of articles mailed upon request. Address W. C. Ashworth, M.D., Owner, Greensboro, N. C.

FOR QUICK SALE—Complete Eye, Ear, Nose and Throat equipment and office furnishings. Inventories $5500.00; will sell very cheap for quick cash sale. Inventory furnished on request. Cause of sale, death of owner. Mrs. A. B. Dancy, 28 Northwood, Jackson, Tennessee.

A Safe and Satisfactory Milk Supply!

" . . . when an infant is deprived of breast milk and has demonstrated an inability to tolerate cow's milk, or when fresh cow's milk of unquestionable purity is not available, the powdered whole milk as produced by a spray process meets a greatly needed demand."

(*W. Va. Med. Jour.*, 28: 193-240 (May) 1932.)

The U. S. Department of Agriculture Stipulates:

"1 quart of milk daily from early childhood to adolescence, and 1 pint or more daily for the adult. . . . When shortage of money forces the expenditure for food to an abnormally low level, the proportion spent for milk should be increased."—(*Amer. Jour. Pub. Health*, April, 1933.)

Advantages of KLIM Powdered Whole Milk:

1 Clean, safe and uniform milk supply for patients of all ages.

2 A most digestible form of milk—fat is broken up and protein made more digestible through process of making.

3 Requires no refrigeration — always fresh and ready for use.

4 No wastage.

SAFE, PURE WHOLE MILK IN POWDERED FORM . . .

KLIM

ACCEPTED AMERICAN MEDICAL ASSN Committee on Foods

Literature and samples, including infant feeding calculator, will be sent on request.

The Borden Company, Dept. KM81, 205 East 42nd St., New York

What's Around the "Puritan Maid" Trade Mark?

Financial Responsibility

Reputation **Dependability**

THESE FIVE POINTS ARE YOUR PROTECTION AND GUARANTEE

Puritan Compressed Gas Corp.

Manufacturers of

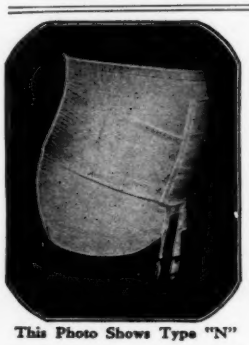
NITROUS OXID—OXYGEN—ETHYLENE—CARBON DIOXID—CARBON DIOXID-OXYGEN MIXTURES

ALL TYPES OF GAS EQUIPMENT—OXYGEN TENTS, ROOMS, ETC.

Offices in Principal Cities

Trademark Registered **STORM** Trademark Registered

Binder and Abdominal Supporter



Gives perfect uplift and is worn with comfort. Made of Cotton, Linen or Silk, washable as underwear.

Three distinct types of Storm Supporters — many variations of each type.

This Photo Shows Type "N"

STORM supporters are made for all conditions needing abdominal uplift. Ptosis, Hernia, Pregnancy, Obesity, Relaxed Sacro-Iliac, Articulations, Kidney Conditions, Post-Operative Support, etc.

Each Belt Made to Order **Ask for Literature**

KATHERINE L. STORM, M. D.

Originator, Owner and Maker

1701 Diamond St. **Philadelphia**

Continued from page 26

The West Tennessee Medical Association, at its regular meeting recently, elected the following officers for the coming year: Dr. A. J. Roby, Covington, President; Dr. R. L. Motley, Memphis, First Vice-President; Dr. G. A. Brandon, Lexington, Second Vice-President; and Dr. George McSwain, Paris, Secretary.

Dr. Charles F. Anderson, Nashville, is the newly elected President of the Middle Tennessee Medical Association.

The following Tennessee physicians have been granted scholarships by the Commonwealth Fund and are doing postgraduate work at Vanderbilt University: Dr. Arthur J. Willis, Jonesboro; Dr. William B. Nash, Stanton; Dr. L. S. Loggins, Charlotte; Dr. Paul D. Jones, Milan; Dr. John S. Hawkins, Springfield; Dr. Maurice L. Connell, Wartrace; Dr. O. M. Swanay, Rogersville; Dr. John R. Smith, Selmer; Dr. T. J. Stockard, Lawrenceburg; Dr. L. L. Highsmith, Kingsport; Dr. J. R. Bone, Lebanon; and Dr. J. E. Clark, College Hill.

Dr. Jarrell Penn, formely of Memphis, has located in Knoxville, with offices in the Medical Arts Building, for the practice of orthopedic surgery.

Dr. R. E. Lee Smith, for sixteen years Superintendent of the Eastern Hospital, Knoxville, has returned to Sparta.

Dr. Dan German, Jr., has located at Franklin, having opened an office with his father.

Dr. J. P. Lindsay is returning to LaFollette to locate after three years' residence in Texas.

Dr. C. G. Bowers and wife, Dr. Margaretta Bowers, formerly of Louisiana, have opened offices in Alamo.

Deaths

Dr. Noah Monroe Dukes, Strawberry Plains, aged 71, died June 6.

Dr. John Gilbert McMillan, Decaturville, aged 72, died May 8.

Dr. Max Goltman, Memphis, aged 66, died June 17 of heart disease.

Dr. Hugh M. Milstead, Hornsby, aged 68, died June 2 of gastric ulcer.

Dr. William S. Sproles, Bluff City, aged 63, died June 6 of carcinoma of the prostate.

Dr. George W. Stanton, Athens, aged 71, died June 12 of cardiac decompensation.

TEXAS

The Texas Pediatric Society has elected the following officers for the coming year: Dr. Sidney R. Kaliski, San Antonio, President; Dr. Ramsey Moore, Dallas, Vice-President; and Dr. Frank M. Martin, San Antonio, Secretary-Treasurer.

Dr. George Herrmann, Galveston, conducted a postgraduate institute at Meridian, Mississippi, in June.

Dr. Edgar H. Vaughn, Tyler, has been doing postgraduate work at the Chicago Eye, Ear, Nose and Throat College.

Dr. John A. McIntosh, San Antonio, is the newly elected President of the Texas Neurological Society.

Dr. Clark A. Wilcox, Wichita Falls, is the newly elected President of the Texas Radiological Society.

The Lamb County Medical Society was organized recently, with Dr. James R. Coen elected President, and Dr. John G. Little, Secretary, both of Littlefield.

The North Plains Medical Society, composed of Sherman, Moore, Dallam and Hartley Counties, was organized recently. Dr. Evans P. Stewart, Stratford, was elected President; and Dr. Victor R. Moore, Dalhart, Secretary.

A collection of books, photographs and letters belonging to the late Dr. N. N. Allen, an early professor of surgery at the State Medical College at Galveston, was recently presented to the College, now the School of Medicine, University of Texas.

Dr. Joseph Herbert Page, Houston, is the newly appointed full-time Health Officer of Harris County.

Deaths

Dr. Frank W. Dimmitt, Sherman, aged 73, died April 9.

Dr. Andrew Daniel Nelson, Richland Springs, aged 68, died May 16.

Dr. Ira Carleton Chase, Fort Worth, aged 64, died June 20 of carcinoma.

Dr. William P. Alexander, Cleburne, aged 80, died June 20.

Dr. William Rounds, Fort Worth, aged 64, died May 22.

Dr. Frank Grosvenor Parkhill, Houston, aged 64, died June 4.

Dr. J. B. Gordon, Stephenville, aged 75, died suddenly May 29.

Continued on page 30

In the Successful Treatment of

MUCOUS COLITIS

Where Diarrhea **is either continuous or intermittent, and as many as 20 to 30 stools daily may be passed—stools which always contain the pathologic triad of feces, that is, blood, mucus and pus, and frequently consist almost entirely of this material—**

Where Varying With Severity **the condition may grow progressively worse to debility and emaciation, with progressive anemia and irregular periods of pyrexia and where death from the condition is not at all infrequent—**

An Eminent Authority Has Found that **infants require but little feeding during the acute stage after which he puts the baby on DRYCO:**

"I put the baby on small quantities of Dryco, full strength, and gradually increased the amount of each feeding as the child improved and could take more. No vomiting occurred after the dextrose and buffer salts were given. With three days of Dryco feeding the stools became of a normal consistency and were free of mucus. The appetite rapidly returned." (Arch. Pediat., Vol. XLIX, No. 2, Feb., 1932).

DRYCO is digested and assimilated when other foods fail and because of the added vitamin D content, babies receive automatic protection against Rickets, the most common nutritional diseases of infancy and childhood.

PRESCRIBE

DRYCO

ACCEPTED AMERICAN MEDICAL ASSN.

Made from superior quality milk from which part of the butterfat has been removed, irradiated by the ultraviolet ray, under license by the Wisconsin Alumni Research Foundation (U. S. Patent No. 1,680,818), and then dried by the "Just" Roller Process.

COUPON

Please send reprints: Mucous Colitis in Infants—Its Etiology and Treatment (Case Reports); Acute & Habitual Vomiting in Infants; Diarrhea; Milk Irradiated by the Carbon Arc Lamp (Abs.); The Prevention and Cure of Rickets through Irradiated Milk; Dryco—The Irradiated Milk (Booklet).

THE DRY MILK COMPANY, Inc.

Dept. SM., 205 East 42nd St., New York, N. Y.

ALL DRYCO IN HANDS OF DRUGGISTS IS IRRADIATED

Continued from page 28

VIRGINIA

The annual meeting of the Medical Society of Virginia will be held in Lynchburg October 24, 25 and 26.

Dr. Hawes Campbell, Jr., is the newly appointed resident physician and surgeon to the Virginia Manual Labor School for Boys and Girls at Hanover.

Dr. A. D. Daughton has located at East Falls Church for the practice of medicine.

A portrait of Dr. John Cullen, first professor of medicine of the Medical College of Virginia, was presented recently to the College and will be placed in the Founders' Room.

A gift of a silver lancet case was made recently to the medical museum of the Medical College of Virginia, the case having been owned by Dr. Bartholomew Egan, the first physician to receive an honorary degree from the Medical College of Virginia.

Members of the Mid-Tidewater Medical Society were guests recently of Dr. Blair Spencer, Ware Neck, on board his schooner-yacht.

Dr. Frank W. Hewlett has opened offices at 3018 Porter Street, Richmond.

Dr. Lawson Cabaniss has become resident physician at the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, having just completed his internship.

Dr. Marshall P. Gordon has located in Richmond, with offices in the Medical Arts Building.

Dr. W. H. Chapman has located at Montvale for general practice.

Dr. Paul D. Camp has located in Richmond with offices in the Professional Building.

The Piedmont and the Albemarle Medical Societies held a joint meeting in June, at which time the Piedmont Society elected the following officers for the coming year: Dr. W. C. Mason, Gordonsville, President; Dr. E. D. Davis, Jr., Crozet, Vice-President; and Dr. W. E. Bray, University, reelected Secretary-Treasurer.

Dr. William C. Schroeder, formerly with the U. S. Public Health Service, has opened offices in the Medical Arts Building, Norfolk, for the practice of tuberculosis.

Dr. Garland Norflett Carter, Boydton, and Miss Susan Elizabeth Carpenter were married June 21.

Dr. Charles Monroe Heartwell, South Hill, and Miss Marjorie Coleman Elmore were married June 24.

Dr. Frank Andes Strickler, Richmond, and Miss Sylvia E. Shafer were married June 24.

Dr. Ira Lionel Hancock, Creeds, and Miss Mary Alice West were married June 24.

Dr. Charles Neill Scott and Miss Florence Ryland Horton, both of Richmond, were married July 1.

Dr. Emmett Vynston Richardson and Miss Gretchen Elizabeth Carroll, both of Glade Spring, were married recently.

Dr. Charles Singleton Dodd, Petersburg and Miss Cordelia Powell Broaddus were married July 8.

Dr. Edwin Raymond Mickle and Miss Ann Meed Ware Austin, both of Tappahannock, were married July 7.

Deaths

Dr. William Rush Gardner, Hillsville, aged 40, died July 11.

Dr. George M. Preston, Lynchburg, aged 55, died suddenly July 3.

Dr. Edgar R. Browning, Flint Hill, aged 62, died July 8.

WEST VIRGINIA

Dr. A. E. McClue, New Cumberland, is the newly appointed Commissioner of the State Department of Health.

Dr. A. D. Ferrell, formerly of Ronceverte, has located at Lewisburg upon his return from the New York Postgraduate Medical School.

Dr. J. Howard Anderson, Hemphill, and Miss Martha Via Stewart were married June 24.

Deaths

Dr. Hearn M. Adkins, Bowen, aged 61, died in June of cerebral hemorrhage.

Dr. Fred W. Vance, Mannington, aged 59, died May 20.

Dr. Harvey C. Powell, Morgantown, aged 52, died June 30 of primary carcinoma of the liver.

THELESTRIN
OVARIAN FOLLICULAR HORMONE

A standardized preparation of the ovarian follicular hormone for intensive ovarian therapy by hypodermic injection.

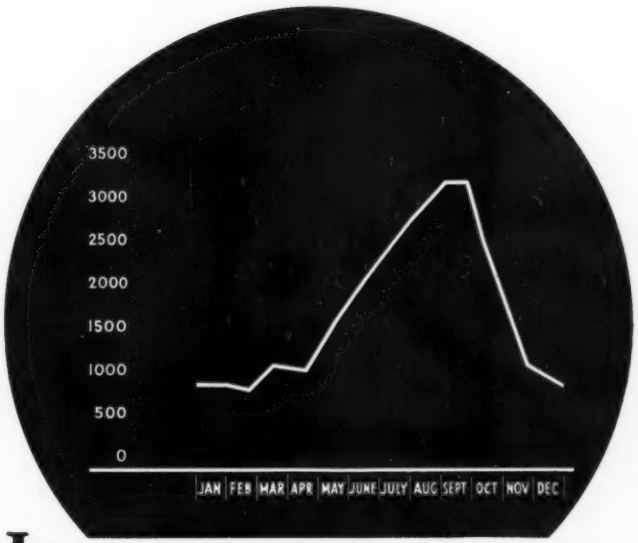
Indicated in the treatment of scanty menstrual flow, amenorrhea and the vasomotor and nervous symptoms of the menopause.

Each ampoule contains 25 rat units standardized by the Allen-Doisy method.

Boxes of 6 1-cc. ampoules

• G. W. CARNRICK CO. •

20 Mt. Pleasant Ave. Newark, N. J.



Mortality by months from diarrhea in infancy (under 2 years of age) for 1929 in United States Birth Registration Area. Figures from Bureau of Census Mortality Statistics.

IT IS STILL A FACTOR

Although infant mortality rates have decreased greatly in the past decade, there is still an uptrend during the summer months in the number of deaths caused by intestinal disturbances.

To combat the depletion and to prevent the destruction of body tissue associated with summer diarrhea, infants have immediate need for water, salts and carbohydrates.

The following suggested formula furnishes nutrition well suited to protect the proteins of the body, to prevent rapid loss in weight, to resist the activity of the infectious bacteria, and to assist in the retention of fluids and salts in the body tissues.

Mellin's Food	**4 level tablespoons**
Water (boiled and cooled)	**16 fluidounces**
Sodium Chloride	**¼ teaspoon**

One to three ounces may be given every hour or two until the stools lessen in number and improve in character. Skimmed milk may be gradually substituted for water until the amount of milk equals the normal quantity. Frequently it may be wise to defer replacing the fat of the milk until after full recovery. In cases where vomiting is a symptom, withholding for a few hours of food and fluids by mouth should precede the introduction of the above formula.

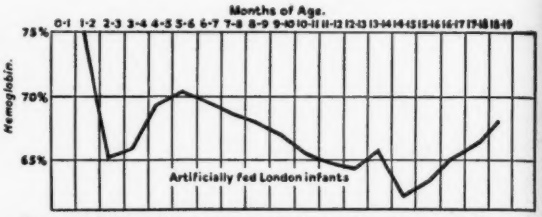
Literature and samples of Mellin's Food gladly supplied—to physicians only.

Mellin's Food: Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate—consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.

MELLIN'S FOOD COMPANY *Boston, Mass.*

Preventing NUTRITIONAL ANEMIA *in Infants through a Normal Dietary Regimen*

NUTRITIONAL anemia was present in 45% of the breast-fed and 51% of the bottle-fed in a group of more than 1,000 infants studied by Mackay.[1] Although this anemia was of mild degree, *it was sufficient approximately to double the morbidity among the artificially fed.*



Hemoglobin level in the blood of infants of various ages. Note fall in hemoglobin, which is closely parallel to that of diminishing iron reserve in liver of average infant. Chart adapted from Mackay.[1]

Anemia Prevalent

Commenting on this work, the British Advisory Committee on Nutrition writes, "This form of anaemia is prevalent among infants, especially those living under conditions of city life, and is attributed to a deficiency of available iron and possibly also of copper. Its most important feature is susceptibility to infection, particularly a liability to colds, otorrhoea, bronchitis, and enteritis, and a tendency for infections to become chronic."[2]

Iron, incorporated in powdered milk, should be given as a routine to bottle-fed infants, according to the recommendations of this committee in a report to the Ministry of Health.

Milk Deficient in Iron

Stored in the liver of the full-term infant is a supply of iron and copper theoretically sufficient for the first six months of life. But actually the reserve is subject to wide variation, probably because of (except in the case of prematures and twins) variations in the iron content of the mother's diet during pregnancy. Hill, for example, says, "If the mother is anemic herself, or if she has eaten little iron-containing food during the last months of pregnancy, her offspring is born with an insufficient iron deposit. . . ."[3]

	IRON	COPPER
Cow's Milk, 14 oz.	1.01 mg.	0.166 mg.
Dextri-Maltose with Vitamin B, 1 oz.	2.40	0.570
	3.41	0.736
Daily Requirement*	3.11	"traces"

It is generally agreed that breast milk and particularly cow's milk are markedly deficient in iron and copper. But when 1 oz. of Dextri-Maltose with Vitamin B is added to 14 oz. cow's milk, properly diluted (as at 1 month), the above increase in iron and copper results.

FOR the same reason that it is desirable to reinforce the milk supply of the infant with iron, the trend is toward the introduction of iron-rich solid foods at an early age. The iron content of many foods is variable, however. Leichsenring and Flor[4] found that children's diets planned to contain 5 and 8.5 mg. iron actually contained only 3.25 and 6.5 mg., respectively. Pablum, higher than most foods in iron and containing standardized amounts of this mineral can be administered as early as the third month, when nutritional anemia begins to appear (see chart above). Clinical studies by Summerfeldt[5] show that Mead's Cereal (of which Pablum is the pre-cooked form) is capable of increasing the hemoglobin percentage of growing children.

	IRON	COPPER
Cow's Milk, 20 oz.	1.44 mg.	0.24 mg.
Dextri-Maltose with Vitamin B, 1½ oz.	3.60	0.855
Mead's Cereal or Pablum (dry), ¼ oz.	1.70	0.09
	6.74	1.185
Daily Requirement*	4.18	"traces"

When ¼ oz. of Pablum is fed to the 3-months-old infant receiving 20 oz. cow's milk and 1½ oz. Dextri-Maltose with Vitamin B, a significant increase in iron and copper takes place.

* The desirable iron intake for children according to Rose *et al*, is 0.76 mg. per 100 calories. Infant of 1 month (8¾ lb.) and infant of 3 months (11¾ lb.), both require 80 calories per lb.[6]

[4-6] *Bibliography on request.*

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